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## Stress-Caused Heart Attacks

Chester M. Denwicz\*

CURRENT STATISTICS DEMONSTRATE that almost any person may be suffering from some degree of hypertension or arteriosclerosis, and that if he enjoys an extended life span, he is likely to sustain a "heart attack" from which his chance of dying is great. Cardiovascular disease has, therefore, become an incident of modern living, and cardiovascular injuries are one of the most controversial areas of liability in the field of workmen's compensation. The conflict concerning heart cases, and especially those related to the "stress incurred," arises primarily from the difficulty of proving causation. The confusion arising from conflicting judicial construction of terms such as "usual strain," "unusual strain," "exceptional strain," is compounded by the conflicting expert medical testimony presented in these cases. Beyond these inconsistencies in both the medical and legal literature, there is the basic conflict between medical and legal concepts of causation. The descriptive phrase, "stress and strain," as applied to the exertion allegedly causing the cardiovascular crisis involved in a particular case may aptly be applied to the incompatibility between legal principles and the opinions of medical experts.<sup>1</sup>

The general legal view was expressed in *Dwyer v. Ford Motor Co.*,<sup>2</sup> where the court concluded:

Whatever the precise connotation of those expressions, the rule governing compensability may be stated in this fashion: If the effort or strain, whether great or little, was an incident of the employee's work and either alone or in combination with disease played a material part in causing, contributing to or accelerating a heart attack, the attack is compensable.

The opening statements made by Justice Weintraub, in his concurrence, are indicative of the confusion in this field:

We granted certification in the hope that we could give helpful guidance in this troublesome area. I fear we have not

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<sup>1</sup> Furlow, *Cardiovascular Disease in Workmen's Compensation*, Lawyers' Medical Cyclopedic Supplement 581 (1964).

<sup>2</sup> 66 N. J. Super. 469, 169 A. 2d 499 (1961).

succeeded. The law is clear enough. The problem is one of proof.

As a result of this continuing lively controversy a good many reported opinions at the highest appellate level have attempted to resolve legal and medicolegal uncertainties. Notwithstanding judicial statements to the contrary, there is some indication of a trend to provide accident and health insurance for the heart victim in the guise of workmen's compensation, and to equate coincidence with causation.<sup>3</sup> This trend has not yet become firmly established, however, and case decisions vary. Aggressive and imaginative counsel may still mold the law to their clients' advantage.<sup>4</sup>

### Stress as a Causative Factor

The relation of effort to the exaggeration of coronary artery disease is a highly controversial matter.<sup>5</sup> A recent and comprehensive study of effort and occupation in relation to coronary occlusion has been made.<sup>6</sup> The study was a review of experiences over a 25 year period in which detailed data was kept concerning 2,600 patients who had survived an acute coronary occlusion. The study divided activity into 6 categories, including sleep, rest, mild activity, moderate activity, walking, and usual or severe exertion. In this group of patients, 70 per cent of the coronary occlusion attacks occurred when the patient was either sleeping, resting or engaging in mild activity. Coronary occlusions occurred during unusual or severe exertion in only 1.9 per cent of the group.

The study concludes that there is no relation between effort, occupation, time of day, or type of activity and the occurrence of coronary occlusion.<sup>7</sup>

Discussion of these problems necessitates definition of the terms "work," "effort," and "stress and strain." Occupational duties require work, effort, or exertion—that is, the expenditure of energy or power, physical or mental (emotional). Work, then, suggests "toiling to achieve a desired

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<sup>3</sup> *Supra* n. 1.

<sup>4</sup> *Ibid.*

<sup>5</sup> Mazel, Trauma and Coronary Heart Disease, 5 Trauma (5) 21 (1964).

<sup>6</sup> Master, The Role of Effort and Occupation in Coronary Occlusion, 174 J. A. M. A. (Oct., 1960).

<sup>7</sup> Mazel, *op. cit. supra* n. 5.

goal." The term "stress and strain," however, suggests "stretching beyond the limits or normal." "Work" implies a normal physiologic process or activity; excessive effort or "stress and strain" suggests there is an abnormal response to this effort, an "injury."<sup>8</sup>

Thus, it has often been claimed that heart attacks are not related to effort because they occur as frequently when a person is at rest as during exercise. If as many attacks occur during the eight hours when one is in bed as during the eight hours one is active, it has been concluded, physical effort has little or nothing to do with precipitating an attack.<sup>9</sup>

There is a vital error in this theory. It is not the ordinary activities to which the individual is accustomed and which he always has performed with comfort that are hazardous.<sup>10</sup> It is the more sudden and more violent and more strenuous efforts that can do damage.<sup>11</sup>

S. A. Levine, M.D., writing in the *Atlantic Monthly*,<sup>12</sup> detailed in simple language the relation between effort and heart disease. Physical effort can be harmful once the sclerotic process has developed. One must realize that a man may have felt well and been regarded as well by his physician a day or two before a heart attack because of a silent, undetectable coronary disease. During this silent period a sudden strenuous effort, such as running after a streetcar, lifting a hundred-pound case, shoveling snow vigorously, or any severe unaccustomed physical effort, can precipitate a heart attack, can cause collapse or even sudden death. The large number of deaths occurring among men over 50 years of age during or directly after shoveling snow attests to the fact that strenuous physical effort is a hazard to some people. To be sure, nothing harmful would have occurred if the hearts in these individuals had been perfectly normal; but they did not know, nor could their physicians have known, that they had vulnerable coronary arteries until after the attacks occurred.

In other words, *unaccustomed*, strenuous physical exercise can be dangerous for some individuals. It certainly can be harmful to those who already are known to have coronary disease.

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<sup>8</sup> Isaacs, Occupation, Trauma, and Cardiovascular Disease, 54 *Annals of Internal Medicine* 229 (1961).

<sup>9</sup> Levine, Exercise and Heart Disease, *Atlantic Monthly*, 43 (July, 1963).

<sup>10</sup> *Ibid.*

<sup>11</sup> *Id.*

<sup>12</sup> *Id.*

Physicians, however, for the most part have been highly critical of the doctrines on which compensability for cardiovascular injuries are based and of the medical testimony tending to establish a relationship between employment and the appearance of cardiovascular disease. Yet, despite criticism by lawyers, physicians, legislators, some administrators and some judges, the doctrine of compensability for cardiovascular injuries due to employment has progressed over the last 50 years.<sup>13</sup>

### Cases Involving Unusual Stress

Consistent with the view that unaccustomed or unusual stress may be a causative factor in cardiovascular injuries, many jurisdictions insist that the exertion be unusual to satisfy the "accident" requirement of workmen's compensation. Some appear to apply this restrictive requirement, in practice, at least primarily to heart cases.<sup>14</sup> A Florida court held that when disabling heart attacks are involved and where such heart conditions are precipitated by work-connected exertion affecting a pre-existing non-disabling heart disease, such injuries are compensable only if the employee was at the time subject to unusual strain or over-exertion not routine to the type of work he was accustomed to performing.<sup>15</sup>

On the other hand, an award was affirmed for a steelworker who sustained a coronary thrombosis while lifting a heavy piece of scrap, supported by medical evidence that there was a direct causal connection between the exertion and the attack. The court reiterated the Illinois rule that there need be neither external violence nor unusual strain or exertion upon the regular duties of the job provided there is proof that the work was "a causative factor."<sup>16</sup>

Recovery for a myocardial infarction resulting in a permanent disability to a coal miner, was based on medical evidence that the work "triggered" the attack. The court held that when the responsive effort demanded of an employee's physical mech-

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<sup>13</sup> Marcus, Problems of Compensability in Cardiovascular Disease Cases, 498 Insur. L. J. 518 (Sept., 1964).

<sup>14</sup> *Ibid.*

<sup>15</sup> Victor Wine & Liquor Inc. v. Beasley, 141 So. 2d 581 (Fla. 1962).

<sup>16</sup> Republic Steel Corp. v. Industrial Commission, 26 Ill. 2d 32, 185 N. E. 2d 877 (1962).

anism in order to do his work contributes to a seizure that would not have occurred at that time except for that effort, however easy and routine it may be, the resulting disability is in some degree attributable to the work and is compensable.<sup>17</sup>

Compensation was denied for death of an employee from acute coronary insufficiency, on medical opinion that a heart attack cannot be precipitated in one suffering from a coronary insufficiency absent extreme exertion or an extreme added work load or something above and beyond the line of duty and in the absence of evidence that claimant had performed work of that character.<sup>18</sup>

### Effect of Pre-existing Heart Condition

Pre-existing heart conditions of the claimants in some cases have been held to vitiate the validity of the claim. Yet other cases have allowed awards where pre-existing conditions were involved.

An award for death from coronary occlusion was set aside on appeal because the evidence showed clearly that the decedent was afflicted with a diseased heart and coronary system which had deteriorated to the point where it could no longer stand the load imposed upon it by his regular and usual work. It was held that his death resulted solely from coronary arteriosclerosis progressing gradually to the point where it caused his death.<sup>19</sup>

Similarly, an employee afflicted with pre-existing arteriosclerosis, who suffered a myocardial infarction following heavy lifting, was not entitled to compensation where the strain was normal to the employment.<sup>20</sup>

However, compensation was granted for death of a state highway employee from acute coronary occlusion after engaging in trimming limbs from a hickory tree, on medical evidence that this work was a contributing cause although decedent had suffered from cardiovascular symptoms for many years.<sup>21</sup>

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<sup>17</sup> *Johnson v. Stone*, 357 S. W. 2d 844 (Ky., 1962).

<sup>18</sup> *Williams v. United Wire & Supply Corp.*, 194 A. 2d 686 (R. I., 1963).

<sup>19</sup> *United States Steel Corp. v. Dykes*, 238 Ind. 599, 154 N. E. 2d 111 (1958).

<sup>20</sup> *Friendly Frost Used Appliances v. Reiser*, 152 So. 2d 721 (Fla., 1963).

<sup>21</sup> *Price v. Houston Fire & Casualty Ins. Co.*, 155 So. 2d 213 (La., 1963).

### Conflicting Medical Testimony

The inconsistencies in the case decisions may be partly explained by the conflicting medical testimony presented which illustrates the controversy present in the medical profession as well.

An award was denied for an infarction of the myocardium due to arteriosclerotic thrombosis, by a divided commission. One physician stated positively that it was reasonable to assume that the work plaintiff was doing at the onset of his pain was the cause of his so-called heart attack. The other medical expert denied any causation and explained that these infarctions occur on the basis of arterial disease which is not, as far as anyone can determine, causally connected. He further testified that the occurrence is due to the formation of clots in these diseased arteries and other physiological processes within the body, that there is no clear evidence as to causation in relation to effort.<sup>22</sup>

A finding of the trial court, affirmed on appeal, that claimant's acute myocardial infarction was caused by his strenuous labor of shoveling rock was based on a general practitioner's opinion that claimant's exertion had precipitated the heart attack, although a specialist in internal medicine with special training in cardiology stated without qualification that the work had nothing to do with the attack.<sup>23</sup>

A commission's denial of compensation to a truck driver, who sustained a myocardial infarction after a period of usual heavy lifting was affirmed upon the opinion of a heart specialist that the exertion had no particular bearing on claimant's heart attack, although claimant's physician was of a contrary opinion.<sup>24</sup>

### Emotional Stress

A study by Morris<sup>25</sup> compared the incidence of coronary occlusions among bus drivers and conductors in London. He found that the drivers, although sitting at all times and not exerting much energy, were under emotional strain in getting through traffic and had a higher incidence of occlusions than did

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<sup>22</sup> *Warren v. Gelfuso*, 188 A. 2d 461 (R. I., 1963).

<sup>23</sup> *Williams v. Skousen Construction Co.*, 73 N. M. 271, 387 P. 2d 590 (1963).

<sup>24</sup> *Joiner v. Farmers Exchange Cooperative Assn.*, 368 S. W. 2d 547 (Mo., 1963).

<sup>25</sup> *Morris*, *Coronary Heart Disease and Physical Activity of Work*, 2 *Lancet*, 1055 (Nov., 1953).

the conductors, who climbed and descended the steps of the double decker buses many times daily.<sup>26</sup>

In *Hamilton v. Transport Workers Union of Greater New York, Local 100*,<sup>27</sup> a union officer was notified that he was relieved of his duties pending a hearing upon a charge of disobedience. Upon medical examination two days before the hearing, his physician found acute exacerbation of a chronic bronchitis, emphysema and bronchiectasis, and advised him to limit his activities to three to four hours per day. This advice was embodied in a letter written by the doctor and exhibited to the officer presiding at the hearing. The hearing proceeded for about 12 hours. Denied the right of representation by counsel, claimant conducted his own defense and the record of the hearing reflects the stresses and pressures he incurred. Claimant's request for adjournment because of acute physical distress was refused. When his symptoms became acute, he left the hearing and retired to his room where he was attended by a physician. Subsequently, this "acute episode" was diagnosed by his cardiologist as a myocardial infarction which competent medical proof related to "the severe emotional strain" of the trial and found "a direct result of the stress during the day." The court recognized that emotional stress in such degree may cause a compensable accident and disability.

A contra decision was reached in *Gordon v. Temple Beth-El of Great Neck*,<sup>28</sup> an action to recover compensation for the death of claimant's deceased husband, the cantor of a synagogue. While directing a rehearsal of the choir for a period of about two hours, standing under strong lights which rendered the atmosphere oppressive, the deceased husband became involved in an argument with one of the choir members and thereafter appeared tense. Later, complaining of illness, he was removed to a hospital where he died the next day of acute myocardial infarction. The Workmen's Compensation Board found that the sequence of events was sufficient to precipitate the coronary condition and hence constituted an accidental injury and awarded compensation. However, the Appellate Division reversed the decision and award, dismissed the claim, and held there was no

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<sup>26</sup> *Ibid.*

<sup>27</sup> 21 A. D. 2d 434, 251 N. Y. S. 2d 104 (1964).

<sup>28</sup> 14 N. Y. 2d 742, 199 N. E. 2d 508 (1964).



substantive evidence to support the award. This decision was later affirmed by the Court of Appeals.

Compensation was affirmed for a salesman who sustained a cerebral thrombosis after a period of work which involved unusual and considerable emotional stress, anxiety and tension which was superimposed upon an underlying hypertension.<sup>29</sup>

The death of 33-year-old director of maintenance and engineering for an airline from myocardial infarction caused by worry over controversy with company officials about plane repairs was held compensable. The court found that undue anxiety, strain and mental stress from work are frequently more devastating than a mere physical injury.<sup>30</sup> Similarly, an award for death of an employee who had been afflicted with advanced generalized arteriosclerosis from myocardial infarction following emotional upset, was affirmed on medical evidence that an emotional upset results in stress upon the heart as much as physical stress, and that anger may be a precipitating cause of heart attacks, either disabling or fatal.<sup>31</sup>

However, compensation was denied a business executive who sustained a cerebral thrombosis resulting in paralysis caused or precipitated by emotional shock, since the event was not an "accident" within the meaning of the act, neither physical labor nor bodily injury being involved.<sup>32</sup>

### Medico-Legal Attitudes

Plainly, the heart cases will continue to be troublesome as long as some reach the appellate courts on a record in which the medical testimony is emphatically certain that effort and exertion have nothing whatever to do with coronary thrombosis, while most such cases are based on the opposite theory.<sup>33</sup>

Differences of opinion are recognized in the approaches to the problem of causation by the medical and legal professions with regard to the attribution of cardiac breakdown to stress

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<sup>29</sup> *Lobman v. Bernhard Altman Corp.*, 19 A. D. 2d 931, 244 N. Y. S. 2d 425 (1963).

<sup>30</sup> *Klimas v. Trans Caribbean Airways, Inc.*, 10 N. Y. 2d 209, 176 N. E. 2d 714 (1961).

<sup>31</sup> *Little v. J. Korber & Co.*, 71 N. M. 294, 378 P. 2d 119 (1963).

<sup>32</sup> *Danziger v. Employers Mutual Liability Ins. Co.*, 245 La. 33, 156 So. 2d 468 (1963).

<sup>33</sup> 1 Larson, *Law of Workmen's Compensation*, 566 (1959).

and strain.<sup>34</sup> In an article by Professor Ben F. Small<sup>35</sup> this dilemma was well illustrated, when he stated:

A single light bulb may be subjected to a multitude of abuses and still burn for a thousand hours. Yet, at any time, a single flick of the switch controlling its energy may light it for the last time. What caused it to burn out? A scientist might find cause in an inherent defect or anomaly in the filament. Another scientist might find cause in wear and tear, the increasing vulnerability of the filament with age and use. What about the switch-on? The scientist might admit that a sudden impulse of energy could be a factor, along with others, in the result observed, but cause, no. Only the lawyer would be artless enough to suggest such a thing as proximate cause or occasionment in the scientist's mere factor, and with the suggestion he would probably hear dark mutterings of post hoc propter hoc, or worse.

In a sense, then, the physician speaks of the cause and the lawyer of a cause; however, the physician recognizes that atherosclerosis is a disease in which a great many factors play a part.<sup>36</sup> The lawyer, on the other hand, would be satisfied with any one of these factors if it could be shown that it contributed to any appreciable degree to heart failure, in the case under consideration.<sup>37</sup>

### Medical View

Lawyers, prosecuting or defending the cardiac claim, members of boards, commissions, and courts should give careful consideration to the recent,<sup>38</sup> Report of the Committee on the Effect of Strain and Trauma on the Heart and Great Vessels,<sup>39</sup> spon-

<sup>34</sup> Furlow, *op. cit. supra* n. 1.

<sup>35</sup> 31 Tex. L. Rev. 630 (1953).

<sup>36</sup> Lawyers' Medical Encyclopedia Supplement 590.26 (1964).

<sup>37</sup> *Ibid.*

<sup>38</sup> Furlow, *op. cit. supra* n. 1.

<sup>39</sup> Dr. Paul D. White served as chairman of the Committee. Other members were Doctors Eugene Clark, Milton Helpern, Arthur M. Master, James C. Paterson, Norman Plummer, Leo Price, Howard B. Sprague, Meyer Texon, and Harry Ungerleider; Professors John Thornton and Felix Moore *ex officio*; and Attorneys Barnett S. Fox, Harry A. Gair, Paul Gurske, and Theodore C. Waters. Dean Harold F. McNiece served as a special legal consultant. Special studies were conducted by Doctors Arnold Engel, Gloria Gallo, Gilbert Grossman, Michael Lyons, and Sidney B. Weinberg. The report of the full committee, including the reports of medical-pathological and legal subcommittees, was presented on February 24, 1963 to the Central Committee for Medical and Community Program of the American Heart Association, and was published in October, 1962, at 26 *Circulation* 612.

sored by the American Heart Association, started in 1953, first published in 1962, and a minority report in 1963.

The report of the medical-pathological subcommittee in this report indicated that an important degree of atherosclerosis of the coronaries is present in approximately 50 per cent of all males over 45 years of age in the United States. In many cases, no symptoms in the individual at his customary level of physical and nervous activity are produced.<sup>40</sup> In an unpredictable number, environmental factors, including usual or unusual effort will reveal the underlying disease by inducing an imbalance between the myocardial demand and the coronary flow.<sup>41</sup>

It found no method, either clinical or pathological, of determining the causative relationship between any given event and typical coronary thrombosis with infarct.<sup>42</sup> It does, however, recognize that coronary insufficiency may be the result of some factors, with a presumptive causal relationship if clinical or electrocardiographic evidence appears during the activity of these factors.<sup>43</sup> Criteria for establishing a relationship of intimal hemorrhage to effort or emotion were not clear enough for the majority of the committee to accept.<sup>44</sup>

The medical-pathological subcommittee recommended in their report the following:<sup>45</sup>

1. Action be taken to improve the quality of medical testimony.
2. In the current absence of acceptable scientific confirmation, heart disease, except in rare instances, shall not be considered as arising out of employment and that presumptive legislation affirming causal relationship of heart disease of any type of employment is unjustified by present scientific evidence.
3. That heart failure shall be considered related to physical or emotional exertion only if the heart failure occurs during the actual period of stress clearly unusual for the individual involved.

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<sup>40</sup> Lawyers Medical Cyclopedia Supplement 590.25-590.44 (1964).

<sup>41</sup> *Id.* at 590.32.

<sup>42</sup> *Id.*

<sup>43</sup> *Id.*

<sup>44</sup> *Id.*

<sup>45</sup> *Id.*

Dr. J. C. Patterson,<sup>46</sup> the only dissenting member of the committee in his minority report, was of the opinion that the evidence at hand favors the verdict that unusual physical exertion or emotional stress may be the precipitating factor not only of acute coronary insufficiency, but of acute coronary occlusion as well.<sup>47</sup> Nor does he consider it proper to reject stress as a disease-producing entity simply because it has no pathognomonic pathological pattern.<sup>48</sup> The clinical evidence that links acute coronary occlusion to stress is circumstantial, but impressive.<sup>49</sup> Persons addicted to lives of stress are seven times more prone to coronary occlusion with myocardial infarction than those with converse behavior.<sup>50</sup>

### Legal View

The Legal Subcommittee in the report based on an analysis of the McNiece Report,<sup>51</sup> and its own judgment, made the following observations with respect to the legal aspects involving heart disease.<sup>52</sup>

Courts have focused on the concept of aggravation in a legal sense, rather than causation in an etiological sense.<sup>53</sup> Cardiac claims have rarely been compensated, on the theory that they are an occupational disease, but rather on the basis that they constitute an accidental injury.<sup>54</sup> When courts speak of the "unusual strain" rule, they are using "unusual strain" as a legal word of art, which varies in meaning from state to state and any resemblance to the medical meaning of the words is little more than coincidental.<sup>55</sup> Courts have made little effort to reduce or apportion the dollar amount of cardiac compensation awards on the basis of proportion of disability or pre-existing disease, but charging the entire disability against the employer.<sup>56</sup> There has

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<sup>46</sup> American Heart Association Inc., 28 *Circulation* 268 (Aug. 1963).

<sup>47</sup> *Id.*

<sup>48</sup> *Id.*

<sup>49</sup> *Id.*

<sup>50</sup> *Id.*

<sup>51</sup> *Heart Disease and the Law* (1961).

<sup>52</sup> *Supra* n. 40.

<sup>53</sup> *Id.* at 590.33.

<sup>54</sup> *Id.* at 590.34.

<sup>55</sup> *Id.*

<sup>56</sup> *Id.*

been almost no tendency by the courts to take a uniform stand in cardiac cases.<sup>57</sup>

The Legal Subcommittee made the following recommendations for the improvement in the administrative and judicial determination of claims involving heart disease:<sup>58</sup>

1. Encourage the interpretation and publication by authoritative medical groups of evidence as to the causative factors in cardiac disease.
2. Disseminate medical information relating to cardiac cases to the general practitioner on a broader scale.
3. Educate the medical witness as to his proper role.
4. Diminish the emphasis by commissions and courts on the language in which medical opinion testimony is couched.
5. Encourage wider use of autopsies.

### Conclusion

The basic problem in this particular area of cardiovascular injuries, therefore, is not one of accidental character, but the extremely difficult medico-legal question of causation.<sup>59</sup> The burden of keeping this class of cases within proper bounds falls squarely on the expert medical witness and the expert trier of facts.<sup>60</sup>

Members of the committee<sup>61</sup> stated the belief that physicians, pathologists, and lawyers cannot solve the matter of the relation of acute coronary occlusion to stress and strain, and agreed the practical answer is to remove heart disease from workmen's compensation and provide coverage in industry by comprehensive medical care insurance.<sup>62</sup> It is clear that workmen's compensation puts little emphasis on rehabilitation and return of the cardiac individual to a normal social and economic activity, and it has been suggested the American Heart Association project a committee to study the comprehensive health and pension schemes of unions, industry, insurance companies, and government in relation to heart disease.<sup>63</sup>

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<sup>57</sup> *Id.*

<sup>58</sup> *Id.* at 590.35.

<sup>59</sup> Larson, *op. cit. supra* n. 33.

<sup>60</sup> *Id.*

<sup>61</sup> *Supra* n. 39.

<sup>62</sup> *Supra* n. 40.

<sup>63</sup> *Id.*