occur. Perhaps the next two years will prove what a valuable tool the LPI could be.

The Liability Property indexes for lines other than automobile appeared to me to be primarily useful as tools to make the public aware of the degree of inflation present in areas allied to each line of insurance, thereby making the need for premium level changes more understandable. Direct translation into rate making procedures will require considerable refinement.

The degree to which these indexes improves on the Consumer Price index is debatable. Perhaps, as interest in developing and maintaining such indexes is created, relationships which more completely measure the change in loss costs will be developed; for the present, the LPI must be regarded only as a general index.

Mr. Masterson has made a valuable contribution to the insurance industry by presenting this paper. However, it's primary value will be as a stimulant to further advances in the measurement of the effect of economic factors on insurance premiums rather than for the specific Liability Property indexes as presented. Unless Mr. Masterson's index is adopted, and improved through study, the value of the contribution will soon be lost. The industry would be best served if the NAIC would establish a subcommittee to oversee the development of such indexes, and the dissemination of the results to the public. In this way, indexes could be established which would be of great service to the industry and which the public would be most likely to trust and understand.

DISCUSSION BY RICHARD D. McCLURE

The crunch of inflation on fire and casualty insurance companies has become more painful in recent years; the creep has become a walk. Executives are increasingly concerned with the long succession of years of underwriting loss. Ratemakers are seeking new ways of projecting loss costs further into the future, so as to achieve premium levels which will be adequate to pay the losses whose cost will continue to escalate.

At the same time, rate filers are encountering stiff opposition to rate increases, especially those based on projections of past losses into the future. In too many cases the attitude of the regulators is that the companies cannot economically justify the increases.

Mr. Masterson's paper, in this light, is most timely and helpful. Here is a series of indexes related directly to our lines of insurance, but derived

from outside impartial statistics published almost entirely by the government. If we are asked to justify a rate change for a line, we can support it not only with our own statistics (company or industry) but also with a supplemental exhibit of indexes dealing directly with the goods and services that the insurance companies must buy in order to settle claims.

The paper describes what indexes were selected. These include:

(a) Consumer Price Indexes for physicians' fees, hospital charges, home repairs, auto repairs, apparel, recreation goods, and commodities less foods;

(b) Wholesale Prices Indexes for glass, machinery and equipment, metal working machines, and others;

(c) Similar statistical tables.

Each line of insurance was examined separately to determine how a meaningful cost index could be established. For example, the index for fire insurance on dwellings is built partly on the Consumer Price Index — home maintenance and repairs, and partly on Boeckh Construction Cost Index — residences.

Although the various weights used for all indexes are set forth in an appendix, the construction of only one index is fully explained. That is the one for automobile bodily injury for the 1966 year. The author uses three sources: Consumer Price Index for daily hospital charges, the same source for physicians' fees, and the Office of Business Economics index for per capita personal income. He takes the first two and makes them into a medical index, giving a weight of .57 to physicians' fees and .43 to hospital costs. These weights vary with the years, and are derived from statistics published by the Social Security Administration.

The author then computes a measure of the out-of-pocket costs, or "specials," of auto BI claimants, and comes up with 60% medical and 40% loss of wages or income. His final index is composed 15% of his medical index, 15% of the personal income index, and 70% of the index he calls "specials" but which, of course, are for the non-specials, or pain and suffering. It may be seen that some elements are common to the three parts. In fact, a little simple algebra reduces the formula for his auto BI index to 57% of his medical index and 43% of the personal income index.

Similar indexes are built up for fourteen other lines. The 1967 numbers vary from a low of 130.7 for glass to 173.2 for workmen's compensation.

With reference to the auto BI index, it is not clear why those weights

were selected. The medical index is reasonable — 57% of physicians' fees and 43% of hospital costs. Then, the specials were found to consist 60% of medical costs and 40% of loss of income, which weights the author does not explain at all. But let us suppose they are reasonable. Then, the final index was made up of 15% for medical, 15% for wages, and 70% for the specials. But if the specials are 60%-40% medical and wages, why should not the first two items be 18% and 12% instead of 15% and 15%?

Incidentally, the author points out that the use of 15-15-70 gives us a factor of 2⅓ of the specials for pain and suffering.

The factor is popularly supposed to range between 2 and 3. The reviewer tested the use of 3, by assigning weights of 12½-12½-75. The final index produced was the same number, 143.8. The reason for no change here is that so many of the base indexes employed trend up in almost the same degree. Using weights of 5-5-90, which means a ratio of 9 to 1 for pain and suffering, moves the index only from 143.8 to 143.9. Using weights of 25-25-50, which means a ratio of only 1 to 1 for pain and suffering, reduces the index from 143.8 to 143.7.

Now, how do these numbers square with the actual loss history of the insurance companies?

The reviewer compared the auto BI index with the average paid auto BI claims of all companies reporting to Insurance Rating Board and Mutual Insurance Rating Bureau. A high degree of correlation was found, over .97. However, the slopes of the regression lines are quite different, being .056 for Mr. Masterson's numbers, and .031 for the actual industry experience. These numbers are for the ten-year period ending 1967. If we shorten the period, the difference becomes even larger. For auto property damage the difference is reversed. Again, the correlation is high, over .98. But the slope of the regression line on the Masterson index is .050, while that for actual industry experience is .060. Pretty close, but the 1967 values are 146.8 and 161.8, respectively, and we would like to see these numbers a lot closer together.

If the Masterson indexes are to be used as prediction tools, more work will have to be done on them so that they more closely resemble the index of actual insurance experience. The next step, it would seem, is for us here to reach some kind of agreement on the composition and base weights in the make-up of these indexes. Also, who is to produce the new numbers as another year rolls by? Perhaps this should be done by a rating bureau.