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CONCEPTS OF ADEQUACY IN PENSION PLAN FUNDING

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Two of the primary reasons for funding an employee retirement plan are (1) to level out what would otherwise be sharply rising future costs and (2) to promote employee security by accumulating funds to back earned pensions. The first of these makes more likely the indefinite continuation of a plan, and the second gives assurance that accrued pensions will be paid regardless of the future fortunes of the company.

In addition to long-range contribution stability, a company may seek other financial objectives in a funding program, such as the safety valve of short-range contribution flexibility. Here, again, there is a presumption of greater employee security through the improved prospect of plan permanence afforded by such flexibility.

As a general rule, therefore, there need be no basic conflict between a company and its employees in the funding of a retirement plan. Both company and employee objectives tend to enhance employee security in its broadest sense, and differences are primarily those of emphasis. Company stress is apt to be on flexible pension contributions within the framework of stable long-range costs, while employee stress (when not on increased benefits) is likely to be on the funding of accrued benefits.

The purpose of this paper is to examine certain funding guidelines which reflect both viewpoints in a logical and consistent fashion. It is concerned with principles as well as with the broad impact of actuarial assumptions and cost methods but is not concerned with specific application of the latter.

In conducting this examination, there are a number of questions for which we should seek better answers than are to be found in our formal literature. For example, what degree of funding might a company logically seek to accomplish over a period of years? How should one define the "actuarial liabilities" which should ultimately be funded, or, otherwise stated, how should one determine the amount of funds which need to be accumulated in order to provide a given measure of employee benefit

* The author wishes to acknowledge contributions made to this subject by his associate, John Hanson, F.S.A., who has developed numerous ideas and techniques in this area.

security? How are these answers affected by differing conditions relating to the employee group?

In seeking answers to these questions, it is necessary to clarify certain concepts, some of which, unfortunately, have long been couched in terms tending to confuse their real significance. For example, actuaries have become so accustomed to viewing an actuarial liability as something which of necessity ought to be amortized that they frequently overlook (1) the substantial difference in concept of actuarial liability according to its method of computation and (2) the resultant immateriality of its amortization in some circumstances. We climb the mountain because it is there—never thinking that a path around may serve just as well or even better in those cases in which the mountain is man-made and has been raised to an arbitrary height.

AN APPROPRIATE FUNDING OBJECTIVE

As has been pointed out by Preston Bassett and others (*TSA*, XVI, paper and discussion on pp. 318 ff.), a basic premise is that if a pension fund equals the value of accrued benefits the plan is fully funded. This is quite obvious in the case of a terminating plan, and is also true in the case of a continuing plan if one may assume that future contributions will exactly fund benefits accruing in the future.¹ This test, based on the one-sum cost of accrued benefits, formed the basis of "benefit security ratios" reported by the author in the *Proceedings of the Conference of Actuaries in Public Practice, 1964-65*, Volume XIV, in a forum entitled "Government Regulation of Private Pensions—Present and Future."

The most significant fact pointed up by the accrued-benefit-funding test is that the actuarial cost methods in use in a majority of plans are such as to fund benefits more rapidly than they accrue, even though no specific provision is being made for the amortization of the unfunded liability by the cost method in question. As a result, when cost methods of such a type (projected-benefit cost methods) are employed, the *unfunded costs of accrued benefits* may automatically become funded, at least in substantial part, by payment of the so-called IRS minimum contribution. Whether there is such automatic funding depends on the maturity of the group in question and whether it is stationary, increasing, or decreasing in size. However, pension plans would invariably reach an *overfunded* position if liabilities by projected-benefit cost methods were fully amortized. Thus, complete benefit security can be provided by funding less than the full amount of the actuarial liabilities by some commonly

¹ A truism in the case of most plans but later qualified.

used actuarial methods. This fact is pertinent to any consideration of the establishment of rigid rules for amortizing such liabilities.

If accrued-benefit costs were all there were to the funding of a pension plan, one might ask why all funding should not be determined in accordance with accrued-benefit cost methods. Aside from the greater contribution flexibility and greater mechanical ease of handling certain types of pension formulas by projected-benefit cost methods, the answer to this question goes back to the question of stabilizing long-range costs and, in turn, perhaps is influenced by what has long been a cardinal principle in individual life insurance funding, namely, the avoidance of rapidly rising costs under schemes such as step-rate assessment insurance. In short, the principle of substituting costs of the "level" type for costs of the "step rate" type has become so nearly second nature to most actuaries that the differences between funding problems applied to individuals and to groups are sometimes overlooked.

Be this as it may, the fact remains that costs of accrued pension benefits determined by the unit-credit method will generally increase until a constant, weighted average age is reached, and such an increasing trend is accentuated whenever there is a multiple weighting of costs with advancing age (as occurs, for example, under an "integrated" plan or a plan based on final average salary). A goal of "leveling" the aggregate costs for the group thus remains a valid objective for the employing company; on this basis alone, projected-benefit cost methods have ample justification.

As between those actuaries who feel that funding should not exceed the value of accrued benefits and those who wish to emphasize the leveling of future cost requirements, the funding concept introduced below should do little violence to either school. Essentially, this concept offers protection against the possibility that an assumption stated earlier—to the effect that future contributions to a plan will exactly fund future benefit accruals—may not be valid if the trend of future costs for the group should be markedly upward.

Assuming that the principal concern of pension funding is employee security and that the two principal guarantees of such security under a retirement plan are (1) the accumulation of funds to back accrued (or vested)² benefits and (2) the stabilization of long-range costs, the following logical long-range funding objective may be postulated. Such a long-range objective, to be reached over a reasonable period of time, would be

² Use of the phrase "accrued (or vested) benefits" is intended to imply a choice, namely, that it is not necessarily appropriate to fund *all* accrued benefits regardless of whether vested.

the larger of (a) a fund sufficient to provide in full all accrued (or vested) benefits *if the plan were to terminate* or (b) a fund sufficient (in the absence of further benefit increases) to maintain a stable contribution level *if the plan were to continue*.

The foregoing funding objective recognizes the obvious fact that a plan will either terminate or continue. A fund sufficient to satisfy either possibility would be the maximum that would ever need to be accumulated, except possibly for the convenience of a company in order to permit variation in its annual contributions.

Different actuarial assumptions may be appropriate and different cost methods are required in the proper evaluation of *a* and *b*. These questions are covered in the material which follows.

"ACTUARIAL LIABILITY" V. "COST OF ACCRUED BENEFITS"

At the risk of belaboring the obvious, let us examine for a moment the difference between projected-benefit cost methods and accrued-benefit cost methods in the matter of cost and fund-accumulation structures. For illustrative purposes we will use the methods commonly known as entry-age-normal and unit-credit, respectively.

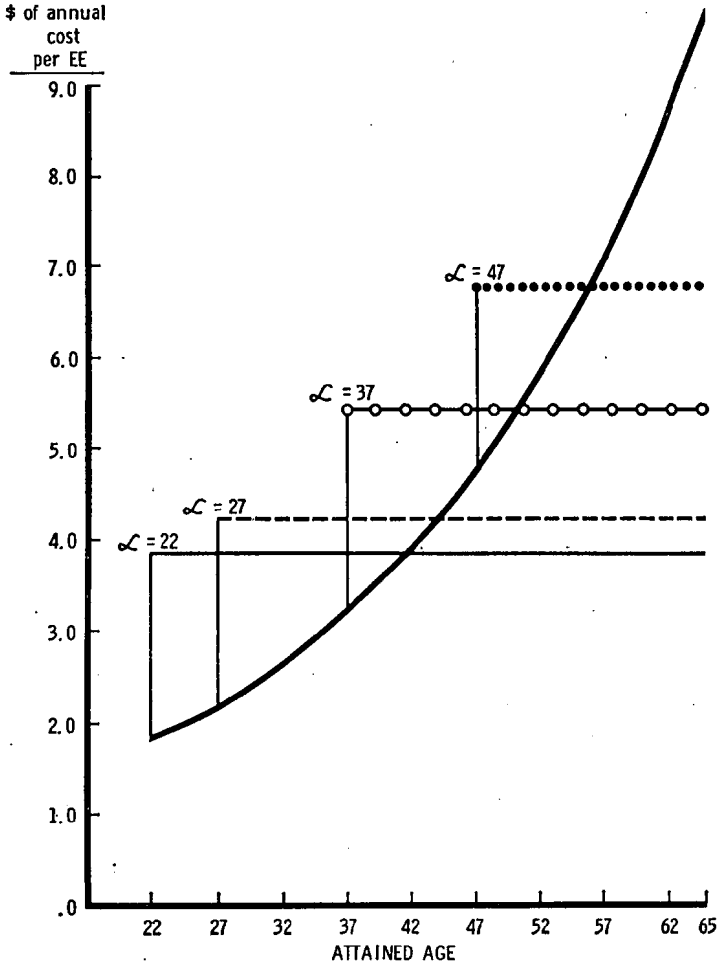
Chart I shows the curve of unit costs by attained age and superimposes the level entry-age-normal costs, at various entry ages, to provide the total projected benefit at retirement. At entry age the capitalized value of the level costs is, of course, identical with the capitalized value of the increasing unit costs payable to retirement date (here assumed to be age 65). If assumptions are the same on each basis, and exactly experienced, it is obvious that, if the "level costs" are contributed, a higher accumulation will result at any point prior to retirement date than if the increasing unit costs are contributed and that at retirement date the accumulations would be identical. Moreover, if a higher yield is experienced than that assumed, there will be a considerably greater excess of the level-cost accumulation at any point, which now will encompass all points beyond retirement as well as before retirement.

Chart II illustrates for a single entry age the comparative accumulations when assumptions are the same on each basis and exactly experienced. Since the lower curve represents the *cost of accrued benefits*, it is apparent that a liquidation or termination occurring midway in the accumulation process would result in a surplus if the level costs had been contributed throughout. The higher the yield in relation to that assumed, the greater would be this surplus. (The latter assumes that gains are either spread or used to reduce any unfunded liability rather than reflected in an immediate reduction in contributions.)

CHART I

COMPARISON OF ONE-SUM COSTS FOR A UNIT OF BENEFIT AT ATTAINED AGE, WITH LEVEL COST FOR PROJECTED BENEFIT FROM ENTRY AGE

(Benefit at age 65 equal to \$1 a year for each year of service)

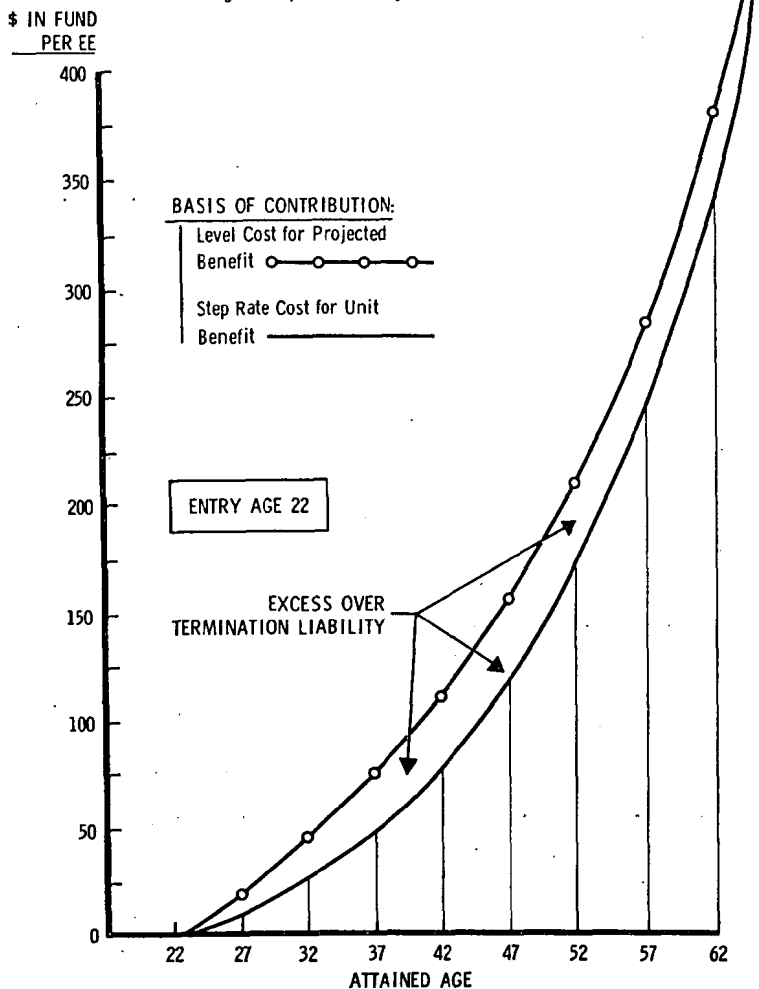


BASIS: WYCO 1965 projected mortality table with
3½% interest, no turnover, no loading

CHART II

COMPARATIVE FUND ACCUMULATIONS FROM ENTRY AGE ACCORDING TO BASIS OF CONTRIBUTIONS

(Benefit at age 65 equal to \$1 a year for each year of service)



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A pension plan covering an employee group consists, of course, of a "mix" of different attained and entry ages. Therefore, the comparative cost- and fund-accumulation structures for such a group consist of composites of the relationships illustrated by Charts I and II. Since there is invariably an excess of level-cost accumulations over increasing-cost accumulations in individual cases, the same must be true for the group. Moreover, with the tendency to use conservative actuarial assumptions this excess will be greatly magnified by favorable experience.

This is exactly the pattern which has developed under many private pension plans during the past decade or two. The combined effect of using projected-benefit cost methods and of experiencing substantial investment gains, particularly under plans invested substantially in equities, is, for example, the primary reason for the very favorable "benefit security ratios" found in the Wyatt Company study, referred to above. This should not have been surprising; what is a little surprising is that actuaries should have done so little to publicize the significant distinction between actuarial liability and cost of accrued benefits, which has so profound an effect on measurements of employee benefit security.

To complete this set of illustrations, Charts III and IV show the actuarial liabilities by the entry-age-normal method and the one-sum costs of accrued benefits for four different employee distributions projected over a 30-year period. All the distributions have been equated as to initial work force, and the plan of benefits is also the same. The distributions illustrated may be characterized as follows:

Distribution I.—An initially immature work force, gradually growing in size.

Distribution II.—An initially immature work force, remaining stationary in size.

Distribution III.—A relatively mature work force, remaining stationary in size.

Distribution IV.—A relatively mature work force, shrinking in size.

The liabilities shown in Chart III for Distribution I, by the entry-age-normal method, have been indicated on two different assumptions: (1) assumptions identical to those used in computing the one-sum costs of accrued benefits—the lower of the two nearly parallel solid lines—and (2) less conservative assumptions (i.e., turnover discount introduced). It may be noted that the actuarial liabilities uniformly exceed the one-sum costs of accrued benefits. There would cease to be a difference only when there are no longer any active employees, at which time the actuarial liability would reduce to the one-sum cost of accrued benefits.

CHART III

"ACTUARIAL LIABILITIES" versus ONE SUM COST OF ACCRUED BENEFITS

Projection for Employee Distributions I and III

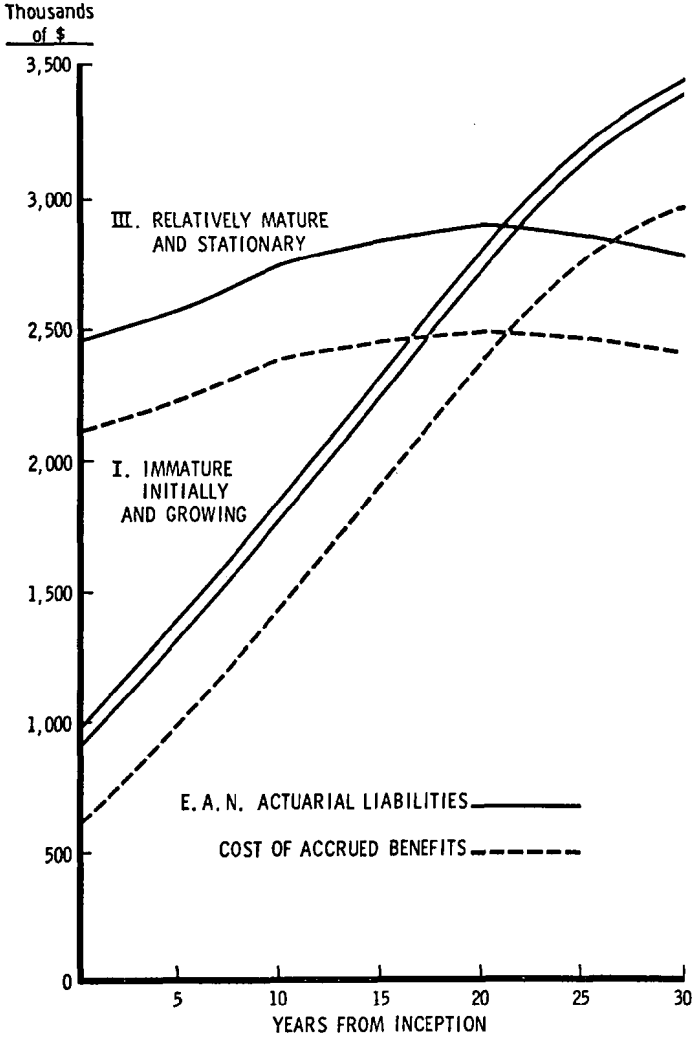
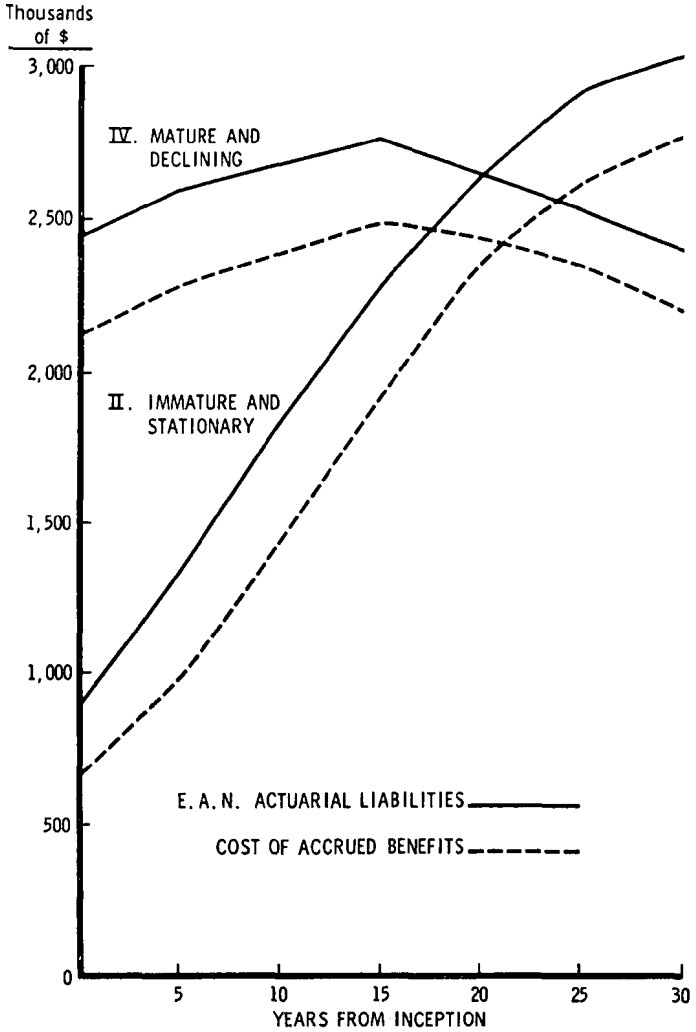


CHART IV

"ACTUARIAL LIABILITIES" versus ONE SUM COST OF ACCRUED BENEFITS
Projection for Employee Distributions II and IV



THE CONTINUING-PLAN OR "GOING CONCERN" CONCEPT

Speaking generally, a "going concern" contribution might be defined as a level contribution in perpetuity (expressed as a percentage of payroll or a per capita cost, as appropriate) whose capitalized value is equal to the value of benefit payments in perpetuity, considering both present and future generations of employees. There are, of course, difficulties with this approach. For one thing, it is impossible to predict the effect of economic and technological factors on the size of the group or its applicable payroll at some distant future point.

To minimize these difficulties, actuaries have found it convenient to adopt the concept of a mature group from which to determine the ultimate cost situation once maturity is reached. In the case of a well-established organization, the assumption of a constant work force moving toward maturity in its age distribution is probably as defensible as any other approach. However, in practice, none of the ideal conditions of a mature group (either initially or in the ultimate) will ever be found.

Despite the nonexistence of stationary and mature groups, the concept of maturity may serve a useful purpose as a limiting value in a pension projection. Since the actuary is confronted with a group of unknown future age distribution and size, practical considerations usually dictate that his valuation be limited to the group of employees existing on the date of valuation, without allowance for new entrants of the future. However, if the actuary wishes to compare the results of a valuation by any particular cost method, with a long-term projection of pension payouts or terminal funding requirements, *considering future new entrants*, the reasonableness of that method in producing long-range stabilized costs for a going concern will be tested by the comparison (see Chart V).

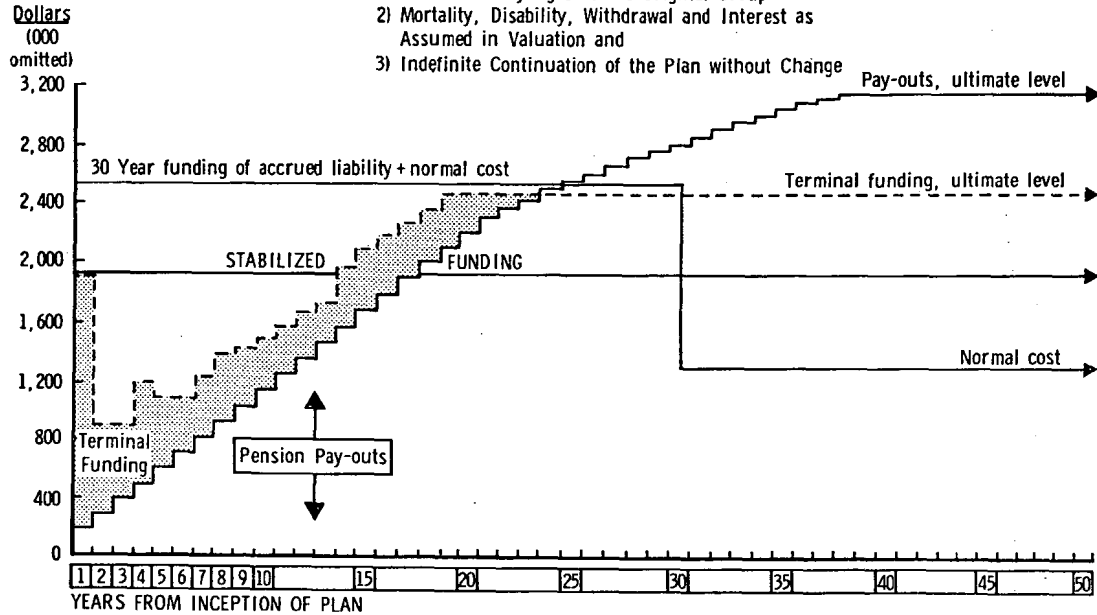
From the viewpoint of a continuing plan, the funding requirements developed by an actuarial valuation should take into account not only the past but also the future requirements on a basis which will tend to equalize long-range trends in the age distribution. The structure of projected-benefit cost methods adapts them to the requirements of a going concern by striking a balance at a given moment of time between (a) the existing funds and anticipated future income and (b) anticipated future disbursements. The entry-age-normal method does this ideally for a mature and stationary work force, but its suitability frequently extends beyond that point.

The manner in which, and the conditions under which, the entry-age-normal method will afford a reasonable representation of the long-range contribution requirements for an organization expecting to continue in business indefinitely may be illustrated by the following example. The

CHART V

PROJECTION OF PENSION CONTRIBUTIONS, PAYOUTS AND TERMINAL FUNDING REQUIREMENTS

- Assuming: 1) Constant Work Force Supported by New Hires with Identical Entry Ages as the Original Group
 2) Mortality, Disability, Withdrawal and Interest as Assumed in Valuation and
 3) Indefinite Continuation of the Plan without Change



figures are presented on the basis of a conventional valuation, the present values of both benefits and normal costs being with respect to present employees only, without allowance for any future new entrants.

1. Present value of future benefit payments	\$42,000,000
2. Present value of future normal costs	16,000,000
3. Balance = Gross actuarial liability	26,000,000
4. Funds accumulated	7,000,000
5. Balance = Unfunded actuarial liability	19,000,000
6. Normal cost (in addition to any payments toward unfunded actuarial liability), used in determination of item 2	1,300,000

Put in the form of a balance sheet, the asset items would be items 4, 2, and 5, usually in that order, and the balancing liabilities would be represented by item 1.

Continuing the illustration, *if future new entrants were introduced in such a manner as to maintain a constant normal cost in future years*, the balance between the asset and liability figures would not be disturbed. For example, assuming new hires sufficient to maintain a constant work force and at the same entry ages as the group being replaced each year (one of several possible assumptions), the normal cost developed by the initial valuation would be paid in perpetuity and the benefits ultimately payable to new entrants of the future would be exactly met by their normal costs. This being the case, items 1 and 2 of the above tabulation would be increased by exactly the same amount, leaving all other figures unaffected.

Thus one of the virtues of the entry-age-normal method is that, even though future new entrants are not specifically considered in a valuation, the result will be as good an approximation of the long-range level of costs for a continuing organization of constant size as it is possible to furnish. In the opinion of many actuaries, the best estimate of the long-range stabilized pension cost is the normal cost plus interest on the unfunded actuarial liability, computed by the entry-age-normal method on assumptions appropriate to a going concern.

For a group of constant size, a cost determined in this manner would support the plan indefinitely, and, even though (in the absence of substantial investment or other experience gains) it would never amortize the unfunded actuarial liability developed by this particular cost method, it might fund a substantial portion of the *unfunded cost of accrued benefits*. For groups of increasing or decreasing size, other factors enter the picture and affect the amount of contribution which is required to establish funding adequacy.

PROTECTION OF BENEFITS ON PLAN TERMINATION

As a practical matter, the objective of protecting accrued (or vested) benefits in the event of plan termination is one which, in the absence of a satisfactory system of insuring unfunded costs, must be sought through a program of amortizing initial unfunded costs over an extended period of years. Without attempting to suggest any guideposts, since companies in varying circumstances would find it necessary to tackle the problem differently, it may be noted that the President's *Cabinet Committee's Report* has recommended that companies should "amortize fully all *accrued liabilities* over a period that roughly approximates the average work life of employees but not more than 30 years" (italics mine). The quotation appears to use "accrued liabilities" in the sense of "actuarial liabilities" as used in this paper.

Whatever the period of years should be, it is extremely important that those becoming involved in this question be made aware that the amount to be amortized should be the *unfunded cost of accrued benefits* rather than the accrued (or actuarial) liability by a particular cost method. Moreover, these accrued benefits need not necessarily encompass all accrued benefits; while this remains a suitable question for discussion, such benefits might properly be limited to vested accrued benefits.

It is interesting to note from the Wyatt Company "benefit security ratios" developed by the author that the cost of *all* accrued benefits on date of valuation (plans ten or more years old) was only about 63 per cent of the actuarial liabilities for those plans using projected-benefit cost methods. In other words, even if this ratio were to reach 80 per cent at some time in the future, compulsory full funding of actuarial liabilities would actually mean the compulsory accumulation of funds 25 per cent in excess of the amount to insure complete security of all accrued benefits, whether vested or not.

A valuation of the cost of accrued benefits, of course, involves different factors and different treatment of benefits than a valuation designed to measure the stabilized long-range contribution on a going-concern basis. For one thing, entirely different assumptions may be appropriate. For another, a special set of rules may be required for the determination of accrued benefits in the event of plan termination, especially in the case of "final average salary" plans or plans where the pension formula does not provide a one-to-one correspondence between years of service (or earnings) and the benefit. Many actuaries are already familiar with these problems, either through their own researching of the question or through the Pension Research Council's recent memoranda relating to its proposed study of benefit-security ratios.

A CONSISTENT APPROACH

To review the funding objective outlined earlier, the maximum fund that *ever* need be accumulated to support the principal pillars of employee security would be the larger of (1) that required to provide the one-sum cost of accrued (or vested) benefits, computed on a plan "close-out" basis, or (2) that which would have resulted from the payment, year after year, of the normal cost plus interest on the initial unfunded actuarial liability by the entry-age-normal method, computed on assumptions appropriate to a going concern. In either case realistic assumptions are appropriate, and market value would be the indicated basis for comparison of assets with the theoretical fund.

(Note that this maximum required fund bears no particular relationship to the gross actuarial liability by the particular cost method and assumptions which the actuary may have selected for his valuation; in fact, it would not result specifically from the amortization of any such cost. Note also that where this maximum fund consists of [1], the goal would generally be reached only after a reasonably long period of years, during which the *unfunded costs of accrued [or vested] benefits* were to be amortized; meanwhile, the fund would consist of the larger of [2] and the partially amortized value of [1].)

As a concession to good engineering, for greater stability we might logically add a third pillar, consisting of a financial cushion (or safety factor), solely for the company's convenience in varying contributions to accord with fluctuating earnings. Additional sums thus set aside might best be considered in relation to a year's "normal" contribution, independently of the so-called adequate fund for security purposes described in the preceding paragraph.

The tests of fund adequacy set forth above appear to the author to be consistent with the realities of pension plan funding. On the one hand, a plan may continue indefinitely, and funding should be sufficient to meet requirements on a going-concern basis. On the other hand, the plan may terminate, and it would then seem desirable to protect employee security, to the extent possible, with respect to accrued benefits. Few would disagree that reasonable provision should be made, over a period of years, to establish such employee security, but in the process current stockholders should be protected against the making of redundant pension contributions which bear no close relationship to these realities.

Funding procedures commonly followed in the past, when not accompanied by an alternative valuation to measure accomplished benefit security, have in some instances led to unwitting overfunding of a plan.

This condition has frequently been accentuated by favorable investment experience, a combined circumstance which led to favorable benefit-security ratios under plans included in the Wyatt Company study. Where overfunding on a plan-termination basis has occurred, future contributions may properly be reduced to the minimum for a going concern, or lower, as long as the favorable situation continues. Further amortization of the actuarial liability would be redundant.

Referring to the two separate aspects of this test of funding adequacy, it may be noted that an organization of undisputed permanence (such as a federal or state government or possibly a large corporation in a basic industry) might properly forego measuring up to (1). However, *any* organization, even the federal government with respect to its employees, should meet the requirements of (2), if for no other reason than to avoid misleading those who foot the bill (taxpayers, stockholders, or employees) as to the true long-range costs of the benefits which have already been adopted. This perhaps classifies as "truth in labeling."

SOME ILLUSTRATIONS

There are many possible variations in the techniques which might be followed in testing the adequacy of a given level of funding. One approach which has been suggested by John Hanson (and possibly others) is to schedule contributions on a stabilized going-concern basis and to make additional contributions only if projections indicate these to be necessary in order to achieve the desired degree of funding of accrued (or vested) benefits within a selected time interval.

Let us say that the interest rate assumed in the calculation of the going-concern contribution is $3\frac{1}{2}$ per cent and that the reserve desired to cover accrued benefits (say, thirty years hence) is also computed at $3\frac{1}{2}$ per cent interest. Then, if we should expect to obtain a higher yield (including capital gains) during the next thirty years, we would test our funding on a projected basis, using the higher yield. This method is illustrated in Table 1 and in the text following.

The most favorable funding characteristics are, of course, exhibited by groups with immature age distributions and which are growing in size. For such groups, the going-concern contribution or "minimum" entry-age-normal contribution (normal cost plus interest on unfunded liability) is, under the particular circumstances illustrated, sufficient to fund all or a substantial part of the cost of accrued benefits over a reasonable period. Security in the event of plan termination is gradually and automatically being established under such circumstances.

The least favorable funding characteristics are exhibited by groups

which are initially mature (or overmature) and which are declining in size. For such groups, contributions well in excess of the going-concern contribution are required in order to fund any part of the cost of accrued benefits. Provision for security in the event of plan termination is of primary concern in these cases, and special provision must be made therefor.

For either Distribution I or II, if a yield of $4\frac{1}{2}$ per cent or better were expected during the first thirty years and excess interest were used to fund

TABLE 1

FUNDING OF ACCRUED BENEFITS ACCOMPLISHED BY PAYMENT OF GOING-CONCERN CONTRIBUTION (NORMAL COST PLUS INTEREST)*
 ACCRUED BENEFITS COMPLETELY FUNDED AT ALL AGES ABOVE AGE SHOWN

END OF YEAR	DISTRIBUTION I (IMMATURE, GROWING)		DISTRIBUTION II (IMMATURE, STATIONARY)		DISTRIBUTION III (MATURE, STATIONARY)		DISTRIBUTION IV (MATURE, DECLINING)	
	Fund Earns $4\frac{1}{2}$ Per Cent	Fund Earns 6 Per Cent	Fund Earns $4\frac{1}{2}$ Per Cent	Fund Earns 6 Per Cent	Fund Earns $4\frac{1}{2}$ Per Cent	Fund Earns 6 Per Cent	Fund Earns $4\frac{1}{2}$ Per Cent	Fund Earns 6 Per Cent
5.....	51	51	51	51	76	76	78	78
10.....	49	47	50	48	74	74	77	76
15.....	48	43	50	45	73	72	78	76
20.....	48	All	50	All	73	71	78	75
25.....	43	All	50	All	74	70	81	76
30.....	All	All	39	All	74	69	79

* Funding of accrued benefits determined on the basis of $3\frac{1}{2}$ per cent interest, no turnover, plan-close-out basis; going-concern contribution computed on the entry-age-normal method at $3\frac{1}{2}$ per cent interest with a turnover discount; fund actually earns $4\frac{1}{2}$ per cent or 6 per cent, as shown in illustration, and excess interest is used to fund rather than to reduce contributions.

benefits rather than to reduce contributions, there would be no need to contribute anything in excess of the "minimum" EAN contribution in order to accomplish a satisfactory amortization of the cost of accrued benefits, even when the latter are computed on the conservative basis of $3\frac{1}{2}$ per cent interest, no turnover, and full vesting of all benefits regardless of age or service.

For Distribution III or IV, on the other hand, no improvement whatever would be achieved in the funded status of accrued benefits by payment of the "minimum" EAN contribution, even if a $4\frac{1}{2}$ per cent yield were experienced and credited in full during the first thirty years. As a matter of fact, even with a 6 per cent yield, no improvement would be achieved under Distribution IV. For these situations, therefore, additional provision must be made for amortizing the cost of accrued benefits.

Another possible approach would be to proceed directly to a projection—say, for thirty years—in order to find the fund objective at that time if accrued benefits were to be fully funded on a plan-close-out basis. The computations needed to determine a “level” contribution might then be summarized as follows:³

Objective: Fund equal to one-sum cost of accrued benefits for all employees, 30 years hence—Distribution II

1. Projected fund required at end of 30 years, to provide all accrued benefits to employees then in service or retired (on a 3½% interest, fully vested basis)				\$2,762,759
	ASSUMED YIELD DURING FIRST THIRTY YEARS			
	3½ Per Cent	4½ Per Cent	6 Per Cent	
2. Present value of item 1	\$ 984,311	\$ 737,657	\$481,024	
3. Present value of expected benefit payments first 30 years	706,358	572,210	421,312	
4. Total present value required	\$1,690,669	\$1,309,867	\$902,336	
5. Level annual contribution to accomplish objective	88,815	76,952	61,843	

For comparison, the following are the initial contributions determined on several alternative valuation bases, all at 3½ per cent interest, for Distribution II:

Entry-age-normal, without turnover discount, 30-year amortization	\$99,000
Entry-age-normal, without turnover discount, “minimum” basis	83,436
Unit-credit, without turnover discount, 30-year amortization basis	78,287
Entry-age-normal, <i>with</i> turnover discount, “minimum” basis	75,374
Unit-credit, without turnover discount, “minimum” basis	67,064

The first basis develops a considerably higher contribution than is needed on a “level” basis, even if only a 3½ per cent yield is obtained. If slightly over a 4½ per cent yield is obtained for thirty years, any of the first four bases develops a sufficient contribution; and, if a 5½ per cent yield is thus obtained, any of the five bases would suffice to produce the full 3½ per cent reserve for accrued benefits at the end of thirty years.

Other techniques may, of course, be employed. These may involve a series of shorter-range goals, whereby the objective is a gradual lowering over a period of years of the age to which full funding of accrued benefits extends. A relatively simple procedure would be to perform dual purpose valuations: (1) according to the method and assumptions selected by the

³ Illustration covers a plan providing flat benefit per year of service. For a plan with benefits based on pay, it would be more appropriate to relate future contributions to future payrolls, in the usual manner.

actuary as appropriate for a continuing plan and (2) on a plan-close-out basis to determine the extent of funding of accrued benefits. Where further progress toward the latter is desired, a short-term projection (five or ten years) will indicate the degree, if any, to which the contribution on basis (1) should be increased.

In connection with periodic actuarial valuations, it may become common practice to project the funded status of a plan after a given number of years, based on different levels of contribution. Given an objective of accumulating, over a specific period of time, the full one-sum cost of accrued benefits for a particular group of employees (perhaps all employees, but more likely all employees who will then have fulfilled certain age and service requirements comparable to "vesting"), the employer can be kept advised of the contribution level required to reach that objective.

CONCLUSION

In the light of repeated benefit improvements under many pension plans in the past, which frequently have had the effect of extending the amortization of unfunded liabilities, the development of a measurement of funding adequacy may formerly have appeared somewhat academic. Yet, in a very real sense, it is not.

Aside from the possibility that benefit improvements will tend to level off in the future and thus neutralize the effect of the foregoing argument, it is important that actuaries clearly define concepts of adequacy in pension plan funding so as to avoid the possibility of confusion. Increasing pressures for regulation, which come largely from sources unfamiliar with actuarial distinctions and the requirements for benefit security, place a responsibility on actuaries to provide appropriate definitions and to direct these pressures into the right channels.

DISCUSSION OF PRECEDING PAPER

CHARLES L. TROWBRIDGE:

Mr. Griffin's "Concepts of Adequacy in Pension Plan Funding" is certainly a welcome addition to actuarial literature. My purpose in discussing his paper is twofold: (1) to demonstrate some of his conclusions (and to indicate certain reservations about others) by use of two mathematical models taken from earlier actuarial literature and (2) to offer alternates to the two specific suggestions that he makes with regard to funding patterns consistent with his stated objective.

Perhaps Mr. Griffin's greatest contribution lies in the clear statement of this objective:

Such a long-range objective, to be reached over a reasonable period of time, would be the larger of (a) a fund sufficient to provide in full all accrued (or vested) benefits *if the plan were to terminate* or (b) a fund sufficient (in the absence of further benefit increases) to maintain a stable contribution level *if the plan were to continue*.

This statement, and the background material preceding it, set forth a duality in the pension funding problem which has *not* been sufficiently emphasized. A rational and responsible approach to the pension funding problem will never be developed unless both of these two criteria—one related to employee benefit security, the other to employer cost stability—are recognized. Mr. Griffin deserves our commendation in furthering this recognition.

It is no doubt unfair to the analytical portion of Mr. Griffin's paper to reduce it to oversimplified statements. I do so (in the next paragraph) only to help point up his case and as a base from which to indicate what few reservations I have as to his conclusions. I trust that he will forgive me if I seem to make free with the *form* of his argument, hoping he will feel that I have *not* really distorted his meaning.

Assuming that I interpret Mr. Griffin correctly, he is telling us essentially these three things:

1. Projected-benefit methods normally produce a supplementary liability substantially in excess of the one-sum cost of accrued benefits.
2. The *complete* amortization of the projected-benefit supplemental liability has inherent in it an element of "overfunding"—and some *partial* amortization will often meet the two-pronged objective without bringing about this overfunding.

3. Nonamortization of the initial projected-benefit supplemental liability *may* result in a funding pattern essentially satisfactory by the *a* test (particularly if the initial work force is immature or if actuarial gains can be counted upon to help), and it, by its very nature, tends to satisfy the *b* test.

In the following analysis of these three statements, I will make liberal use of the mathematical models published as a part of my 1952 paper appearing in Volume IV of the *Transactions*.¹ Table II of that paper traces a mature population, stationary in size, thereby somewhat akin to Mr. Griffin's Distribution III. Table IV represents an initially immature work force stationary in size and hence similar in nature to Mr. Griffin's Distribution II. It should perhaps be pointed out that the 1952 models represent a work force subject to substantial nonvested withdrawal at the younger ages, whereas I am not sure in this regard in the Griffin illustration.

First, as to the validity of statement 1, it is entirely clear that the projected-benefit (entry-age-normal) supplemental liability is always larger than the accrued-benefit (unit-credit) supplemental liability, which is by definition the one-sum cost of accrued benefits, provided the actuarial assumptions are the same. To be absolutely precise, we must except the trivial case where the active work force has become zero. We must also except the case (which we will meet later in this discussion) where approximate or artificial entry ages have been used and the case where benefits accrue more rapidly in early years than in the later. Since none of these exceptions apply to the 1952 models, we find a pattern for them (see Chart I) similar to that shown in Mr. Griffin's Charts III and IV.

The one-sum cost tends to run at about 82 per cent of the EAN actuarial liability on the 1952 initially mature model and increases from 65 to 82 per cent by duration for the initially immature. One gets a similar impression from Mr. Griffin's charts. The fact that his Distribution III does not produce entirely horizontal lines means only that Distribution III is, as advertised, only "relatively mature." Perhaps it does not, initially, have a full complement of retired lives. The comparative steepness of the graphs for his Distribution II seems to indicate that his 1966 model is initially *more immature* than my 1952 immature model.

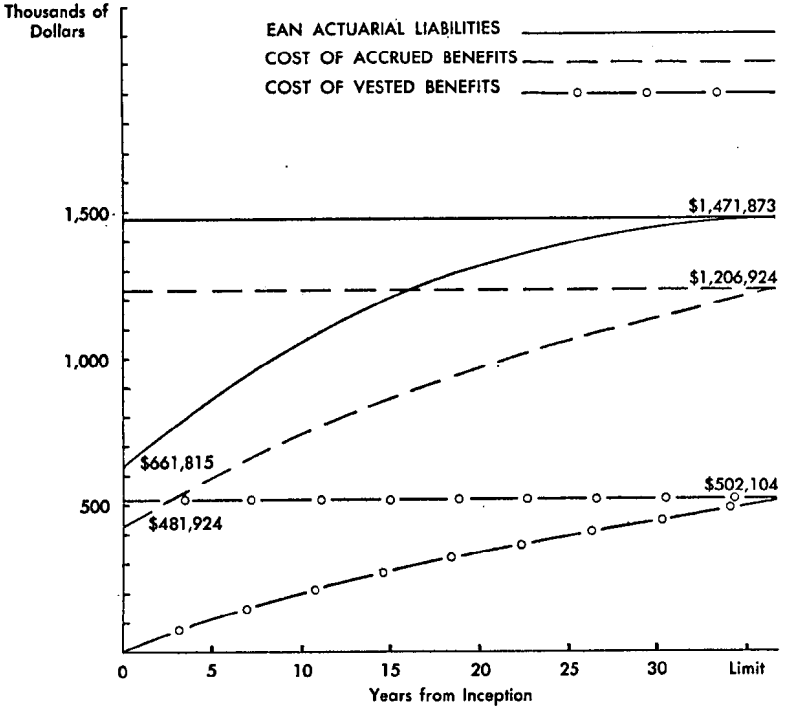
Let us now examine statement 2. If the one-sum cost of accrued benefits is only 65-85 per cent of the EAN actuarial liabilities, does it then follow that full amortization of the latter will necessarily cause overfunding as measured by the former? It would seem so—*except* for the change in actuarial assumptions that may be appropriate for the "close out" calculation. To provide for the one-sum cost of all accrued benefits

¹ "Fundamentals of Pension Funding," *TSA*, Vol. IV, 1952.

CHART I

"ACTUARIAL LIABILITIES" VERSUS ONE-SUM COST OF ACCRUED BENEFITS AND VESTED BENEFITS

MODELS FROM 1952 PAPER



Horizontal lines: Table II initially mature; *upward sloping lines:* Table IV initially immature. Both models stationary work force; both involve discount for withdrawal; no vesting until age 65.

discounted only for mortality and interest requires about \$1,415,000 for the mature model (or the ultimate phases of the immature). Thus the full amortization of the EAN actuarial liability results in overfunding of only 4 per cent *if* the criterion for employee security is the full funding of accrued benefits *with continuation of employment not a condition for receiving these benefits*. Another model with higher withdrawal rates might indicate no overfunding at all. (I can conceive of close-out situations in which future benefits might be subject to continued employment with the same or a successor employer; but the more likely situation seems to involve "vesting" at plan termination.) On the other hand, if the criterion is only the one-sum cost of *vested* benefits (Mr. Griffin deliberately gives a choice here), the overfunding would be very apparent. In these earlier models no vesting takes place until retirement at age 65 and only slightly more than \$500,000 is required.

It is my feeling that Mr. Griffin would admit this one reservation regarding statement 2. He somewhere states that "different actuarial assumptions may be appropriate . . . in the proper evaluation of *a* and *b*." I assume that this disappearance of the withdrawal discount on plan termination is at least one of the things he had in mind. It should be noted that there may be other assumption changes appropriate for plan termination that work in the opposite direction. In particular, any assumption as to future salary increase also tends to disappear.

Let us go on to statement 3. Again, the 1952 models help—this time to determine the degree of employee security arising from funding by entry-age-normal cost plus interest.

For the mature model we find that the so-called IRS minimum funding is algebraically and numerically equivalent to pay-as-you-go—hence no funding whatsoever occurs. Clearly, for a group initially mature (and this implies a mature group of pensioners as well as of workers) normal cost plus interest gives no employee security whatsoever.

On the other hand, as I think was clearly stated and illustrated in the 1952 paper, this minimum sort of funding *does* produce substantial funds in the much more meaningful immature model. Essentially, the *initial* supplementary liability is 0 per cent funded, all increases in the supplementary liability are 100 per cent funded, and the eventual result is partial funding, all as measured by the projected-benefit EAN actuarial liability. Mr. Griffin points out that under some circumstances partial funding of the projected-benefit supplementary liability may result in full funding of the accrued benefit to date.

Specifically normal cost (on EAN) plus interest eventually builds up \$810,000 in the immature model illustrated by Table IV. Retired life

benefits (the only fully vested benefits in this model) require \$502,000. The \$810,000 will therefore not only fully fund the retired lives but will also provide about 44 per cent of the accrued benefits for active lives (provided the discount for withdrawal is still appropriate) or, expressed another way, will fund accrued benefits down to about age 59. On the other hand, if our concept of plan termination causes us to lose the withdrawal discount, the 44 per cent reduces to 34 per cent. The age 59 stays unchanged, because this model has little or no discount for withdrawal above age 55.

In comparing the results obtained above with Mr. Griffin's results, we must be aware of an important difference in the handling of actuarial gains. The 1952 models were constructed in such a way that the actual experience as to mortality, interest, and withdrawal was identical to that assumed. There are, therefore, neither actuarial gains nor losses in the model; and the results obtained in no way rely upon actuarial gains to increase the degree of employee security.

Mr. Griffin's illustrations do assume actuarial gains (at least in the interest element), and the extra interest is not employed to reduce contributions. You can think of his actuarial cost method as entry age normal *with initial supplementary liability funded each year to the extent of that year's actuarial gains*. From this viewpoint, he is not really illustrating normal cost plus interest but instead is illustrating a relatively slow but accelerating amortization of the projected-benefit supplementary liability through the nonrecognition of what eventually become substantial actuarial gains. My guess is that both the $4\frac{1}{2}$ per cent and the 6 per cent illustrations on page 61 would eventually (on Distributions I and II) fund not only all accrued benefits but in time the full EAN actuarial liability. Mr. Griffin has not given us $3\frac{1}{2}$ per cent illustrations. Were he to do so, we could better separate out the effect of actuarial gains from the effect of the maturing of the groups.

For Distributions III and IV, on the other hand, poor results will be obtained no matter what rate of interest is earned. For a truly mature group (with a full complement of retired lives), we have seen that normal cost plus interest builds up no funds. Extra interest on zero principal is still zero. The reason why the ages given for Distributions III and IV in Mr. Griffin's table are not all 100 or above must be that the initial group was not really mature in the sense used in the 1952 mature model.

All in all, the above analysis fairly well substantiates statement 3. Certainly the extent to which entry-age-normal cost plus interest will (all by itself) fund accrued benefits is a function of the degree of immaturity in the initial distribution. The theoretical range of funds built up under normal cost plus interest is from absolute zero (for the initially mature

situation) to the full supplementary liability for the actuarial cost method employed (for the employee group all newly hired). In the past, some actuaries have expressed mild displeasure with my 1952 paper because I chose to classify normal-cost-plus-interest funding in Class I. Their point is well taken. I might better have indicated a *range* of class designation. Consistent with this, entry age normal, interest only could have been called Class I-IV; unit credit, interest only, Class I-III.

In addition, *if* conservative actuarial assumptions are employed and *if* the resulting actuarial gains are applied against the unfunded liabilities, then the security of the pension expectations may well approach 100 per cent in time. I must admit to a little surprise in seeing an illustration based on absorption of actuarial gains in the unfunded supplementary liability. Although Mr. Griffin's method for adjusting actuarial gains or losses (letting the adjustment for actuarial gains or losses be reflected in the *time* when supplementary liabilities are amortized) seems reasonable and practical, it is not clear that it would fit the usual interpretation of IRS regulations. Clearly, however, it is the method commonly employed with respect to "unrealized" capital gains or losses on common stocks.

I see nothing to quarrel with in his demonstration that interest-only funding is quite satisfactory from an employer-cost viewpoint. Only for the declining work force, where the fixed "interest" contribution would be an increasing charge per active employee, would its cost-stability characteristics be open to any question.

This brings me to the details of how one might set up a simple and sensible funding pattern, based on partial rather than complete amortization of the projected-benefit supplementary liability, in order to avoid Mr. Griffin's overfunding. Mr. Griffin suggests at least two ideas, both based on reaching a predetermined goal n years into the future. His two suggestions appear to be actuarially equivalent (or at least approximately so). Both appear to involve a "shifting of gears" at the end of the n th year.

Another that might appeal to some can be expressed as follows: If we can determine that entry-age-normal cost plus interest funding will eventually be about $\$D$ short of the employee-security criterion, we can *artificially raise the entry ages* of the initial employee group so that the classically calculated entry-age-normal supplementary liability is reduced by $\$D$, the present value of future normal costs increased by $\$D$. This procedure is much more legitimate than it appears at first glance (and, incidentally, shows up much of the artificiality in the entry-age supplementary liability concept). Then, if the funding proceeds on the resulting normal cost (increased) plus the resulting interest (decreased), the employee-security goal will eventually be reached, assuming (as Mr. Griffin

must in his methods, too) that a reasonably accurate projection can be made to determine $\$D$. On this score, however, I am not quite as hopeful as Mr. Griffin appears to be. Too many assumptions, particularly as to new lives, are needed.

I have previously suggested still another possibility in a 1963 paper.² Although the family of methods there suggested does not appear to involve any concept of supplementary liability, both Mr. Nesbitt and Mr. MacKinnon pointed out (in the discussion) that the actuarial cost method suggested is closely akin to a partial amortization of the entry-age supplementary liability. As a matter of interest, note, from Table II of the 1963 paper (which uses the same model as Table IV of the 1952 paper), how well a k of just over 4 per cent would approximate the present value of accrued benefits—or a k of 1.7 per cent would approximate the present value of vested benefits. The trick, of course, is to determine the k 's a priori.

I hope that Mr. Griffin's paper will stimulate thoughtful discussion. His paper is clearly aimed at certain non-actuarial circles, as well as at pension actuaries. Other actuaries can help by contributing intelligent discussion of the basic issues that he raises.

FREDERICK P. SLOAT:

Mr. Griffin merits high commendation for a very fine paper that organizes in uncomplicated and lucid style some important concepts in pension funding. It analyzes both by word and picture the distinction between various actuarial liabilities that have been indiscriminately tagged as past-service costs over the years. It is very timely in setting forth so well the influence of varying employee distributions.

In the early days of the development of pension plans in the United States, the most important funding vehicle in use was the group annuity contract using allocated funding, that is, the application of each dollar paid to the purchase of an annuity.

The accrued-benefit cost method was the natural way to utilize the group annuity approach, and it was variously referred to as the single-premium, unit-credit, or step-rate method. The latter described the effect of the method with respect to any particular employee. This step-rate characteristic created concern over the potential rising costs of a plan, unless it was for a mature group where the effect of deaths, turnover, salary changes, and retirements and of new entrants at young ages was such as to keep the aggregate costs reasonably level from year to year.

² "The Unfunded Present Value Family of Pension Funding Methods," *TSA*, Vol. XV, 1963.

After deposit administration and trust funding came into use, in order to eliminate the purchases of units of annuity and their subsequent cancellation when employees left the plan, the accrued-benefit cost method was often applied to them. Under federal income tax rulings, experience gains had to be recognized in the current or next year. This was usually not too serious with group annuity dividends because the insurance companies declared only part of any gains at one time. With nonallocated funding, however, investment and turnover gains could be quite substantial in some years, and it was very desirable to be able to spread their effect.

The popularity of the projected-benefit cost methods was prompted, in part, because, with any one of these methods, it is possible to spread experience gains and, in part, because it produces a larger amount of past-service cost. This increases the employer's funding flexibility by widening the spread between a 10 per cent payment in any year and interest only (or less, if part of the past-service cost has previously been funded). The fact that such a method eliminates the potential increasing cost resulting from advancing ages of the employees, thus tending to stabilize long-range costs, is an important reason but has not always been the most impelling reason. Further, as Mr. Griffin points out, this method is more suitable to certain types of pension formulas.

The projected-benefit cost method can be used for two very different reasons. Because of its basic nature, together with the ability to spread net gains, it is used to give a more uniform and consistent incidence of cost from year to year. But, because of its increased flexibility, it is also used to permit wider voluntary swings in amounts funded from year to year than under the accrued-benefit cost method.

Mr. Griffin has pointed to two developments over the years that have obscured the direction of pension funding. One has been the favorable investment climate, whereby most pension funds have grown much more rapidly than could have been anticipated, even without the usual actuarial conservatism for long-range pension financing. The other has been the pattern of plan improvements and amendments which has required frequent alterations of the funding status of a plan.

As he demonstrates in his paper, the entry-age-normal actuarial liabilities are always in excess of the cost of accrued benefits if computed on comparable bases and assumptions, so that, if the past service is being funded, there will be a point at which all accrued benefits will be funded. During the preparation of Ernest L. Hicks' *Research Study*, I discussed with him the impact of his conclusion that past-service cost should be taken into expense over a reasonable period. I felt that in some situa-

tions it may be undesirable or unnecessary to continue such charging of the remaining past-service cost when a total amount equal to the value of all accrued benefits has already been charged. He pointed out that, under the conclusions of his study, an employer can change the actuarial cost method used for accrual of pension costs in any year but it would require a consistency exception by the auditor. Thus, a change to the accrued-benefit cost method when the value of all accrued benefits had been charged to expense would require him to make such an exception. While this would not require the auditor to qualify his audit opinion, the inclusion of such consistency exception might appear to weaken it.

If the forthcoming opinion of the Accounting Principles Board on accounting for costs of pensions should state that the charge to expense may include either amortization of the past-service cost or interest only on unfunded past-service cost, this question might still arise. It might be desirable to charge the amortization of past-service cost only up to the point where the value of all accrued benefits is covered and to charge interest only thereafter. Further, the opinion might call for such amortization up to the point where the value of all vested benefits is covered.

Each of the usual actuarial cost methods is founded on a basic concept that makes it a rational procedure. As Charles L. Trowbridge set forth in his paper entitled "The Unfunded Present Value Family of Pension Funding Methods" (*TSA*, Vol. XV), there is a great range of possible actuarial cost methods, only a few of which can be so independently formulated. It might be very useful if a method using the long-range objective described by Mr. Griffin were deemed an actuarial cost method. It belongs in the family of projected-benefit cost methods, but that terminology presents a problem since the modification, or inside limit, is determined by the accrued-benefit cost method. It could be referred to as a "projected-benefit cost method with supplemental liability and with accrued- (vested-) benefit limit." For older terminology, we would add the expression "with accrued- (vested-) benefit limit," for example, "entry-age-normal with accrued-benefit limit." The added expression would refer to the provision that, when the amounts funded (or charged to expense) were sufficient to cover the value of all accrued- (or vested-) benefits at that time, further amounts would automatically be the normal cost and interest on the unfunded past-service cost. It should be noted that the actuarial assumptions and application of the pension formula for this limiting feature may differ from those for the main application of the actuarial cost method. This is one reason why it might seem to constitute an actuarial cost method rather than just a procedural step under one of the other methods.

PRESTON C. BASSETT:

I am pleased that Frank Griffin has found the time to set forth his thoughts on the adequacy of pension plan funding.

It is particularly important for us to recognize and to be sure that others recognize, to the extent possible, the distinction that Frank makes between actuarial or accrued liability, as normally used for valuation purposes, and the value of accrued benefits. Full funding objectives have been met when the assets valued on a realistic basis are equal to the value of the *accrued* credited benefits, also valued on a realistic basis. This determination is separate and distinct from the determination of actuarial or accrued liabilities under the usual actuarial methods and assumptions.

I was pleased to see set forth in this paper the long-range objective, to be reached over a reasonable period of time, to be

the larger of (a) a fund sufficient to provide in full all accrued (or vested) benefits *if the plan were to terminate* or (b) a fund sufficient (in the absence of further benefit increases) to maintain a stable contribution level *if the plan were to continue*.

In this quotation, it should be noted that Frank does not state that this objective should be reached by any rigorous pattern of contributions but only that it be reached over a period of time. This is important, and I wish to take a minute to emphasize this fact in discussing the adequacy of pension plan funding.

Adequacy may also include the pattern of how the company reaches the ultimate objective. The actual funding of the plan to meet the objectives must take into account how much the company may desire to contribute at any particular time. This is usually expressed by the flexibility that the company has in determining the contributions in any year or period of years. It is this flexibility that has permitted many companies to adopt and improve pension plans and fund them to the favorable level that has been reached today. A company should be informed of its cost and understand the obligations it must meet, but it should be free to meet these obligations in its own way and in its own time. Only in this way can we expect to see a continuation in the fine growth of private pension plans, both for new plans and improvements in old plans.

Flexibility in determining the current level of contributions is vitally important for most companies. We have seen it in the casualty insurance companies, where contributions were decreased in years of sizable losses such as occurred when Hazel and Betsy created such havoc. We have seen it in utility companies who have made extra contributions when the

revenues were unusually large and profits greater following cold winters or hot summers. We saw it in the case of steel companies who reduce contributions in the years in which they had prolonged industrial strikes. Flexibility in the amount of company contributions has been an important factor in the companies' financial planning.

It is fine to set forth long-range objectives and goals based upon level of funding and adequacy of the fund, but let it remain with the company to plot its own course to reach these objectives. I do not believe that it is necessary for the government, the accounting profession, actuaries, or someone else to establish rigid rules which call for set contribution levels in order to meet a desirable objective which can be reached under current regulations and practices. A company should be left free to establish its own patterns to reach these goals and even to change them as conditions change in the future. Current practices have done a fine job in the past, and I see no need for any change in this area.

There is one other comment that I would like to make in regard to adequacy of funding. I do not believe that an adequate standard of funding, as defined by Frank Griffin, can be firmly established without also considering the plan design. It seems to me that the funding objective of a plan that is negotiated with the union every few years to provide greater benefits might require a very different approach than a unilateral plan with benefits based on the average of earnings during the years just prior to retirement. In the former case, we can assume that there will be increasing liabilities in the future, whereas, in the latter case, future improvements may already have been taken care of by the formula itself. Thus, the period to reach the objective for the union-negotiated plans might be a shorter period, since we can reasonably expect additional increments to be added. This can be expressed in another fashion by asking the question "How do we set goals for adequacy of funding for an inadequate plan that must be amended in the future?" Which is more important: (a) to fund benefits adequately to protect employees in the event the plan is terminated or (b) to make the benefit adequate on a thinner funding basis so that retired employees will have better standards of living, on the assumption that the company will continue to operate in the future? It may not be the job of the actuary to answer these questions, but it is certainly the actuary's responsibility to be sure the client understands the implications of these questions.

JOHN K. DYER, JR.:

Mr. Griffin's timely paper should be of particular value to pension actuaries in inspiring them to consider more objectively and critically

the actuarial cost methods that they may adopt on behalf of their clients. At the same time, hopefully, the paper may serve some important collateral purposes—such as to demonstrate the fallacy of public criticisms of actuaries for their “uncertainty” and to give some logical direction to the thinking of those who would attempt to legislate actuarial soundness.

I agree that the author’s dual funding objective, which forms the keynote of the paper, does, in fact, represent a logical and desirable funding objective in many cases. I was a little disturbed to note that as the paper unfolded there seemed to be an increasing tendency to employ this objective as though it were the ultimate truth rather than simply one test of funding adequacy, appropriate in some but not all circumstances.

The concept of “accrued benefits,” seemingly a simple one, has many pitfalls. Only in the case of a plan which defines clearly and precisely the partial benefits that each employee may expect to receive in the event of plan termination can this concept be interpreted with certainty. In many, and perhaps most, cases the emphasis upon a continuing plan is so great that the full benefit upon retirement is the only one of which the employees are really aware. In this situation an employee’s partial benefit expectation at any point short of retirement age might be quite different from the “accrued benefit” that the actuary might determine, from a termination formula or otherwise. This raises some doubt as to whether the funding of such an “accrued benefit” can generally be considered as “full funding,” especially in the case of a plan which promises benefits based on final pay. To illustrate, there have been cases in which a final pay plan has been replaced by a career pay or profit-sharing plan and where the past-service credits representing rights accrued under the old plan have been established on a basis more favorable than would result from the application of the old plan formula to the earnings rate at the point of change.

A similar doubt arises as to the adequacy of the “stable contribution” test when applied to a career pay plan. Many actuaries feel that, for a career pay plan, a higher level of funding should be maintained than for a final pay plan—in effect, funding against the greater risk that the benefits of the career pay plan may become inadequate. Thus if “normal cost plus interest” is satisfactory as one of the tests of funding adequacy for a final pay plan, it could be maintained that for a career pay plan the corresponding test should be based upon a higher level of funding (assuming equivalent actuarial assumptions, of course).

Finally, I should like to underline the rather obvious points that “complete benefit security” is an ideal but quite unattainable objective and that “overfunding” is a technical condition determinable only by refer-

ence to some arbitrary measure of benefit security. It is from these truths that our prized funding flexibilities are derived. If we are to retain these flexibilities, it is incumbent upon us to avoid statements which, in or out of context, could be used in support of statutory limitations on funding levels.

PAUL H. JACKSON:

Mr. Griffin, in his excellent paper, takes up the fundamental question of "How much money is really necessary?" in pension funding. The paper is of particular importance in view of the current considerations being given to the accounting aspects of pension costs. The paper sets out the clear-cut logic underlying one particular funding method and demonstrates that the funds developed are adequate for benefit security, even though that method may not measure up to what accountants or others might wish to suggest as "minimum requirements."

The paper states, "As a general rule, therefore, there is no basic conflict between a company and its employees in the funding of a retirement plan." There are, of course, many situations in which the interests of the company and its employees will coincide. In a very real sense, however, there are basic differences between the interests of (a) the stockholders of a company, (b) the customers of the company, and (c) the employees. An increase in compensation costs, whether pensions or direct pay, probably results in decreased profit to current stockholders or in higher prices to current customers. Therefore, a mandatory increase in pension costs through the enforcement of unrealistic minimum funding regulations may result in a near-future depressing of the level of pension benefits or of pay rates, in a current depressing of profits, or in a current increase in price to the customer, with any such changes being counterbalanced by opposite changes in the distant future. The "general rule" stated is not, however, fundamental to either the argument or to the conclusions drawn in the paper.

Chart II of the paper illustrates the excess fund developed under a projected-benefit method with a level cost over an individual's working career as opposed to the fund that would be developed under a step-rate cost method funding only the accrued liabilities. In practice, this excess may arise from two sources: (1) a basic actuarial excess that results from the use of level costs for funding to replace the actual costs, which have an increasing pattern, and (2) an excess that may arise out of the use of actuarial assumptions for determining projected benefits that produce values larger than the termination liability. Under plans with career average formulas or flat benefits, the second item of excess does not normally arise.

On the other hand, if a final pay plan is fully funded on the unit-

credit method with a realistic salary scale and modest withdrawal rates, then a surplus may emerge at plan termination simply because the accrued benefits for funding purposes are based on a projected final average pay discounted for some withdrawal, while the benefits actually granted at plan termination would be based on current pay or a recent past-average pay. Of course, it would be possible to base close-out benefits on a projected final average by applying the salary-scale factor used for funding to current pay rates. This is rarely done directly, however, and possibly the IRS would not permit such an artificial increase in benefits. Most, if not all, of the illustrations in the paper are based on a flat benefit per year of service, so that the "unnecessary" excess funding arises only from the first source, that is, the excess funds built up by the use of a level premium. Where benefits are based on final pay, the entry-age-normal contribution with full amortization could produce a much larger degree of excess funding than the example in the paper because of this second source. And, for integrated plans with excess benefits or stepped-up benefit rates, the excess funding from this second source is greatly increased. Thus the examples used may actually understate the case.

The paper suggests that there has been a tendency in the past to use conservative actuarial assumptions. This is no doubt true over all, but, looking to the individual assumptions, the salary-scale factors have quite generally been inadequate. In the past ten years or so, actuarial losses arising from salary increases in excess of salary-scale assumptions have been less than the excess-interest gains for many mature pension funds. It remains to be seen whether this relationship will hold true in the future. If wage inflation were to occur in a period of falling stock prices, as is currently the case in some European countries, and possibly here too, the inadequacy in salary-scale factors will not conveniently be offset by realized and unrealized capital gains. Realism in salary-scale factors appears even more desirable when minimum adequate funding, as suggested in the paper, is followed.

Where an employer anticipates an interest yield of 6 per cent during the first thirty years of his pension fund, a valuation based on a $3\frac{1}{2}$ per cent interest assumption could not be considered realistic (unless there are offsetting elements in the form of nonconservative mortality, turnover, or salary-scale assumptions). Under such circumstances, even the payment of normal cost and interest only will result in deliberate plan funding based on anticipated actuarial gains. The use of realistic assumptions for valuation will eliminate such anticipated actuarial gains, and then the funding must rely on either the immaturity of the group or on specific additional payments over the going-concern level cost, or both.

When accountants propose minimum and maximum limits on the pension contributions that will be accepted for accounting purposes and when the IRS imposes further minimum and maximum limits for tax-deductibility, it becomes ever more likely that a given employer will be forced into several pension valuations, that is, a formal valuation for tax purposes, possibly another for accounting purposes, and, almost certainly, yet another conducted on realistic assumptions for management consideration. In connection with the latter type of valuation, the use of current market value for assets may be justified, but a measure of asset value that has a greater degree of stability than current market value seems desirable for the tax and accounting valuations.

The paper suggests a third reason for pension funding, namely, to provide a financial cushion that is built up as a safety factor so that a company can vary its pension contributions with fluctuating earnings. Not only do company earnings fluctuate with the economic cycle, but they are likely to depend on the relative maturity of the company and the industry. The rapid growth of companies in some industries and the concurrent decline of companies in other industries suggest that reasonable funding requirements should permit a company to pay more into its pension fund during the period when profits are at their peak in order to permit a decrease in pension costs in the company's declining years without necessitating a cutback in benefits. Unfortunately, the accountants would apparently prefer to require uniform payments from all organizations regardless of their youthfulness or senility. And, in much the same manner, there can be a temptation for actuaries to follow the funding procedure suggested in the paper for all companies. Corporations need self-discipline in their pension funding just as an individual needs self-discipline if he "buys term insurance and saves the difference." But, carrying this analogy one step further, just as an accountant should not force the individual to purchase ordinary life insurance, neither should an accountant force a corporation to build up full net level premium reserves for pensions when Mr. Griffin's "Illinois method" clearly develops adequate funds.

There are many actuaries who will personally prefer heavier funding for most of the plans that they work on, and many employers may wish to put more into their pension plans than the minimum described in Mr. Griffin's paper. If there must be regulation, however, be it direct or indirect, all concerned would seem to profit by having the widest possible range in "acceptable" pension contributions. Mr. Griffin has made an excellent case for the right of some companies to pay less than normal cost and thirty-year amortization. At the same time, it is entirely possible

that some organizations, perhaps newly established or rapidly growing, can find valid justification in adopting a pension plan on a pay-as-you-go basis, on a terminal-funding basis, or on some other funding basis that is even less strict than the basis suggested by Mr. Griffin. By denying such companies the right to embark on a pension scheme unless they pay amounts which actuaries, accountants, or others feel are "desirable," such companies may merely defer the adoption of a formal pension program. And, if IRS should ever adopt rules that deny the employer a tax deduction for his payments to a pay-as-you-go plan on an informal basis, these firms may simply shrug their shoulders when their old-timers are no longer able to work, keep them on the active payroll for a few months, and then drop them. Whether the personal heartache that results from such a procedure will be offset by the added benefits gained by regulation and soundness is questionable.

Some actuaries have apparently already concluded that a pension plan which is underfunded is worse than no pension plan at all. It is difficult indeed to argue with a logic that sparkles with such a hard gemlike flame—unless, that is, one happens to be the particular individual who is now receiving no pension at all simply because his ex-employer was unable to meet the stiff requirements for an absolutely sound plan.

Mr. Griffin's paper raises the interesting question of whether accountants or others could possibly justify forcing employers to amortize what amounts to an imaginary liability merely for the sake of comparability or consistency. Going a bit further, surely a question could be raised as to whether a formal pension fund with a positive current balance really constitutes a crime against society because the funds on hand are less than a theoretical number derived by actuarial formulas and acceptable funding principles but based in the final analysis on mere assumptions regarding the likelihood of future happenings which, for those of us who are scientifically oriented, must be considered as indeterminable.

Mr. Griffin's paper illustrates funding methods that come closer to consulting actuarial practice than anything in the extant literature. He is to be congratulated on a clear-cut exposition of the very important aspect of adequacy in pension funding.

WALTER SHUR:

Mr. Griffin has made a real contribution in identifying clearly the two basic purposes of funding a pension plan and in pointing up the difference between amortizing the unfunded cost of accrued benefits and the unfunded accrued (or actuarial) liability.

It was noted in the paper that an organization of undisputed per-

manence, such as the federal government, might properly forgo measuring up to the single-sum cost of accrued benefits but should meet the requirement of stabilizing long-range costs. In February, 1965, the President appointed a Cabinet Committee on Federal Staff Retirement Systems to review, among other things, the financial soundness of these systems. The funding recommendations of this Committee's report, as they apply to the important Civil Service Retirement System, would appear to be of interest in the light of Mr. Griffin's paper and in the light of the President's report on private pensions.

Two important factors related to the Committee's funding proposals are (1) it has been estimated that, without improved funding, the Civil Service Retirement and Disability Fund would vanish in about twenty-five years and (2) the Committee recommended a number of liberalizations³ in the program which would increase the unfunded accrued liability by about \$3 billion and the normal cost by about 1 per cent. With these changes, the unfunded accrued liability would be about \$45 billion (against a fund of about \$15 billion), and the normal cost would be about 14½ per cent.

The Committee made three basic recommendations with regard to improved funding:

1. The total of employee and government contributions should be equal to normal cost, and future benefit liberalizations that increase the normal cost should be reflected by correspondingly increased contribution rates.

2. Future increases in unfunded accrued liability resulting from benefit liberalizations, general wage increases, and so forth, should be amortized over a thirty-year period by direct government appropriations to the fund, in accordance with an arithmetically increasing amortization schedule. For example, the \$3 billion increase in unfunded accrued liability resulting from the Committee's recommendations would be financed by contributing approximately \$12 million in the first year, \$24 million in the second year, \$36 million in the third year, and, finally, \$360 million in the thirtieth year. The Committee noted that this arrangement "avoids large accumulations in the early years."

3. The Committee recognized that there were strains on the fund not covered by the first two recommendations, principally failure to pay interest on the existing unfunded accrued liability and payment directly from the fund of automatic increases in retired benefits because of increases in the consumer price index. It was recommended, therefore, that Congress make automatic payments

³ The most interesting of these proposed liberalizations is one that provides that an employee who is entitled to benefits under the Civil Service plan will receive the greater of (1) the regular benefit provided by the plan or (2) the benefit that would have been paid under social security if federal service had been considered covered employment under the social security system.

to the fund (without the need for current appropriations, that is, in the same manner that interest is paid on the public debt) whenever the fund would otherwise decrease from the prior year and whenever the fund would otherwise be less than the accumulated value of all employees' past contributions.

It is interesting that the Committee based a part of its proposal on the concept of maintaining the fund at least equal to employees' equities. As Mr. Griffin pointed out, and I would agree with him, there is no real necessity for this in a plan backed by the taxing power of the federal government. It was undoubtedly felt that, while going only part way, this would be an easier concept to sell than more difficult actuarial concepts, such as payment of interest on the unfunded accrued liability.

The real significance of the foregoing is difficult to evaluate when we recognize that the fund, which consists entirely of United States government bonds, is nothing more than formal recognition of government obligations to the retirement system, and the \$45 billion unfunded accrued liability is nothing more than failure to recognize formally an obligation that is just as real. As Mr. Griffin noted, however, appropriate funding is required, if for no other reason than to avoid misleading those who foot the bill (in this case, the taxpayer). This problem was discussed in considerable detail in my paper on the subject a few years ago (*TSA*, XVI, 265) and needs no further elaboration here.

ABRAHAM M. NIESSEN:

There is nothing more damaging to the public image of the actuarial profession than the disagreement among actuaries regarding what makes a pension plan sound and what makes it unsound. Recently, actuarial literature has begun dealing with the problem of setting down certain principles regarding the question of actuarial soundness. Mr. Griffin's paper is an important and timely contribution in this area.

The paper does much to clarify the confusion that exists in the minds of some of our professional brethren as to the intimate connection between the adequacy of a particular funding method and the type of plan to which this method applies. The author did an excellent job in stimulating clear thinking on the subject and in analyzing the true meaning of certain accrued and unfunded liability figures that are frequently considered basic to an evaluation of actuarial soundness.

For me, as an actuary serving a federally administered retirement plan, Mr. Griffin's paper has special significance in that it draws a clear distinction between plans that can be presumed to be permanent and plans whose permanence is open to question. For plans of the former type, Mr. Griffin would be satisfied with a method of financing that calls for paying entry-age-normal (EAN) costs plus interest on the unfunded

accrued liability (UAL). This is essentially the method of financing used for the railroad retirement system. We at the Board have always been saying that this method is proper for our system, but some people have at one time or another taken issue with us on this point. I am delighted to have an endorsement of our views by an authority of Mr. Griffin's stature.

Mr. Griffin's paper also lends indirect support to my view that UAL figures computed under the customary definition are not of particular relevance for the railroad retirement system. I have discussed this problem in a paper that appeared in the 1954 volume of the *Transactions* and in a special monograph published in 1963 as *RRB Actuarial Study No. 7*. In the railroad retirement case, the issue is even further confused by the fact that contributions with respect to future entrants are scheduled to be higher than EAN costs as well as by the financial co-ordination with the social security system. This, in my opinion, is a prime example of how misleading the indiscriminate use of UAL figures can be in certain circumstances.

It is my sincere hope that Mr. Griffin's excellent paper will once and for all make it unnecessary for us to defend ourselves against allegations of unsound funding based on UAL figures that we occasionally publish in the interest of full disclosure of actuarial facts.

ROBERT D. KRINSKY AND JACK M. ELKIN:

We agree in general with Mr. Griffin's suggestion of a funding objective that looks to the accumulation of assets equal to the larger of (1) the lump-sum cost of accrued (or vested) benefits computed on a plan-close-out basis or (2) the amount that would have resulted from the payment year after year of the normal cost plus interest on the unfunded actuarial liability on the entry-age-normal method.

The illustrations in Mr. Griffin's paper are based mainly on plans paying a flat benefit per year of service without limitation on the number of years of service. A substantial number of plans, however, limit the number of years that may be credited to a specific period such as 20, 25, or 30 years. In these cases, the "accrued benefit," the cost of which is to be met, can be thought of in at least two ways, namely, as (1) the flat benefit per year multiplied by the number of years of service to the maximum creditable or (2) the maximum benefit payable multiplied by the ratio of the years of service to such years increased by the years remaining to normal retirement age. The two definitions coalesce, of course, in the case of an employee whose years of service at his normal retirement age, if he continued in service until then, would not exceed the maximum creditable under the plan.

Under the first definition, the cost of accrued benefits is always lower

than the accrued liability calculated on the entry-age-normal cost method in the case of an employee whose service at normal retirement age will not exceed the maximum creditable. In other cases, the accrued-benefit cost is lower until some, usually short, time before the maximum creditable service period is completed; thereafter it is higher, until retirement, when, of course, it is equal.

Under definition 1,

$$\text{Accrued-benefit cost} = \frac{(x-w)N_r}{D_x},$$

$$\text{Accrued liability} = \frac{B_{w,r}N_r}{N_w - N_r} \cdot \frac{N_w - N_x}{D_x},$$

where

$B_{w,r}$ = benefit payable at age r on basis of service from age w ,

x = present age,

w = entry age.

The accrued-benefit cost is less than the accrued liability if

$$\frac{B_{w,r}(N_w - N_x)}{N_w - N_r} > x - w.$$

If $B_{w,r} = r - w$, the accrued liability exceeds the accrued benefit if

$$\frac{(r-w)(N_w - N_x)}{N_w - N_r} > x - w;$$

that is, if

$$\frac{N_w - N_x}{x - w} > \frac{N_w - N_r}{r - w}.$$

The left side is the average of the first $x - w$, and the right side of the first $r - w$, D values starting with D_w . Since D is a decreasing function of age and since $r > x$, the first average always exceeds the second.

For $B_{w,r}$ sufficiently (depending on the service table used) less than $r - w$, the inequality is reversed.

If this first definition of accrued benefits is used as the basis for a government-mandated vesting provision, it could, in some funds, especially those with fixed negotiated contribution rates, create serious problems by adding substantially to the cost.

From the point of view of equity, it also would seem that the second definition is preferable. Consider the case of the two workers in the same industry who begin work in neighboring cities at age 30, one under Pension Plan A, the other under Plan B. Each plan pays a normal benefit of \$100 at age 65 after twenty-five years of service. The first worker remains

covered by Plan A throughout his working lifetime; the second moves to the jurisdiction of Plan A at age 50, after twenty years under Plan B. Under the first definition of accrued benefits, the first worker would get a monthly pension of \$100, while the second, merely by the act of moving to a neighboring city, would get $\frac{2}{5}$ of \$100 plus $\frac{1}{5}$ of \$100, or \$140 per month. Under the second definition of accrued benefits, the second worker would receive $\frac{2}{5}$ of \$100 plus $\frac{1}{5}$ of \$100, or \$100 per month, the same as the first worker.

A plan providing a benefit equal to a percentage of salary per year of service produces a relationship between the cost of accrued benefits and accumulations on entry-age-normal funding analagous to that in Chart II of Mr. Griffin's paper. It should be noted, however, that, when a salary scale is used in the calculations of accruals on entry-age-normal cost funding, the accumulations are substantially larger than if no salary scale were used, and the excess of the accumulations over the cost of accrued benefits is much greater.

The remainder of our comments deal with the adequacy of pension fund contributions and the amortization of the "maximum fund that ever need be accumulated."

As Mr. Griffin suggests, it does not seem reasonable that the period of amortization should be the same for a plan covering a handful of employees of a corporation that is likely to terminate when the principals retire or die as for a plan covering the employees of a corporate giant in a basic industry. In general, the amortization period could be much longer for the latter. Similarly, for a multiemployer, industry-wide plan that is likely to exist as long as the industry exists, regardless of the fate of individual employers, a relatively long amortization schedule seems appropriate.

The fact that contributions are fixed by negotiation, however, may give rise to a special problem. A contraction of the industry, because of automation, for example, is most often at the expense of the short-service employees, with the result that the per capita unfunded accrued liability may increase. If the fixed contribution had been meeting actuarial costs on an interest-only or near interest-only schedule, it may fail to do so after the contraction. The same situation may occur, of course, in a contracting single-employer plan that is being financed by means of a fixed negotiated contribution. State and local government funds, of course, are in a class by themselves; from the standpoint of adequacy, there is seldom any need for rapid funding.

Apart from the purely actuarial considerations, we feel that mandatory funding requirements and vesting provisions as prerequisites to plan

approval may distort the correct priorities in the establishment of pension plans. Mandatory vesting may impede the establishment of new pension plans. A pension plan can be a significant item in total labor cost. To increase this cost initially—as vesting would—may increase an employer's reluctance to undertake the cost. On the other hand, if pension plans are permitted to establish themselves without the additional cost of vesting, if they are permitted to maintain their own priorities among higher initial benefits, early retirement benefits, and vesting, they may very well eventually adopt all these provisions.

That vesting is desirable is accepted by almost everyone. And most people concerned with the establishment and operation of pension plans see vesting as a present or future improvement in their plans. Greater knowledge among those covered by pension plans of exactly what rights accrue to them under the plans, and increased discussion of vesting, will accelerate the present trend toward vesting in existing pension plans. Mandatory funding will remove much of the flexibility from the development and growth of pension plans.

Most pension plan administrators, recognizing that the plans may not continue in perpetuity, that they may some day be terminated, do adopt schedules which amortize past-service liability. But actuarial gains, fluctuations in experience, changes in benefit levels, acquisition of new companies, admission of new groups of employers (in the case of multi-employer pension plans), changing cash requirements of a corporate enterprise, plus the hundreds of other changes that are likely to take place in an emerging pension program, make fixed, mandated amortization objectives difficult to achieve.

Prudent financial and actuarial policies dictate that reasonable conservatism be one of the criteria for scheduling contributions to support a program. And this often dictates amortization, since both the actuary and his client recognize that no enterprise is perpetual. However, the degree and type of amortization that is most appropriate to any business or industry can generally best be determined by the employer and the union, if any, not by a government agency.

HERBERT L. FEAY:

I have enjoyed reading Mr. Griffin's paper. One purpose of a good paper should be to disturb complacency and to cause thinking on the subject it covers. Mr. Griffin's paper has done this for me, and the extent of the discussions submitted here indicates that this is true for others.

One of the main sources of difficulty for an understanding of pension funding is the confusion regarding the purposes of the valuations made to

support employer contributions reported in federal income tax returns. The ingenuity of actuaries has produced a large number of variations in methods and standards for determining the present value of benefits and for providing for that present value by annual payments in the future. These methods and standards will give a wide distribution of annual pension plan contribution amounts for the current year and for future years. The primary concern of these calculations is support for the current deduction in the tax return and is not the determination of the proper ultimate funding costs.

Mr. Griffin is concerned about overfunding of pension plans. I doubt if there are many plans that are now overfunded, and I am of the opinion that there are now a number of plans that will be underfunded if the current levels of contributions are continued.

Mr. Griffin emphasizes the unit-credit and the entry-age-normal cost methods of calculating funding costs. The entry-age-normal cost method will usually give a greater accrued-liability total and a smaller normal-cost present-value total than the unit-credit method. The entry-age-normal method will thus usually give a greater degree of flexibility for contributions. This greater flexibility is more evident after the plan has been in effect for a few years and prior contributions have been larger than the absolute minimum. If the employer is interested in as low an initial cost as possible, the unit-credit method for normal costs plus interest only on the unfunded liability will probably give the desired results. If the employer wants to make higher contributions in the earlier years for a plan and to have a basis for greater flexibility later to meet the effects of inflation or of reduced business profits, the normal-cost method is likely to be the better funding procedure.

These same considerations can extend to the selection of the actuarial standards other than the calculation method. These other standards include the interest rate, the termination rates for active employees, retirement rates, the mortality rates for various classes of retired lives (early, disability, normal, and deferred), and the expenses of the pension plan. Conservative standards for the unit-credit method can give about the same funding costs as more realistic standards for the entry-age-normal cost method. Certainty of such an equality, of course, can only be secured by two separate valuations, using the two sets of methods and standards.

Regardless of the valuation methods and standards followed, the problems of overfunding will not come up until the assets of the fund exceed the minimum desirable funding total. At that time it should not be difficult to change valuation standards and methods so as to eliminate any

danger of future overfunding. The new standards and methods will reduce the contributions otherwise allowed as tax-return deductions from income and will probably be readily acceptable to the income tax authorities.

In this connection, I point out that the main concern of the income tax authorities is the current tax deduction for contributions and not the future guaranteed safety of the plan.

Mr. Griffin demonstrates that if a pension plan has an increasing deferred-pension liability that is supported by assets producing income at a sufficient rate in excess of valuation rate, the excess-interest earnings will fund the unfunded liability established for the plan on its effective date. Such large excess-interest gains indicate the desirability of increasing the valuation interest rate.

In no part of his discussion does Mr. Griffin mention the expenses of operation for a pension plan. These expenses are certainly part of the cost of a pension plan for which funding (payments) must be provided. Administrative expenses for active employees probably can be assumed to remain fairly constant, but expenses of paying pension benefits after retirement should be funded in advance of retirement. Certainly the present value of future expenses should be included with the single-premium value of accrued benefits in determining the minimum desirable amount of funded liability.

Mr. Griffin does not cover disability benefits or death benefits of pension plans in his determination of funding costs. Frequently these benefits are included on what is called a "one-year term basis." Actually, this is equivalent to terminal funding, since the costs for each plan year equal the reserve liabilities and the benefit payments for the claims approved in that particular year. The costs for these supplementary benefits will increase for Mr. Griffin's immature groups. These costs need to be considered in a realistic appraisal of future benefit costs for funding purposes.

The paper has no comment on the funding requirements for costs of early retirement benefits and for optional pensions. The assumption that these costs will be eliminated by "actuarial equivalent" factors is not correct for many plans.

Mr. Griffin's "another possible approach" at the end of his paper provides a suggested procedure for pension plan calculations. The actuary can make a careful and exact valuation of all benefits provided by a pension plan, using standards that he has determined to be his best estimates of future results for investment earnings, plan expenses, termination rates, disability rates, and mortality rates for active employees

and for retired employees. The calculations can have a specified target date (such as thirty years in the future) for calculations on a "close-out basis" at that future date, as suggested by Mr. Griffin. Reasonable assumptions can be made for the future size of the work force, for future new entrants, and for future compensation scales. The employer contributions for the plan costs determined on this proposed basis can then be spread over the thirty years by some method. The employer can first be given the estimated level annual contribution for the thirty-year period and then advised of how actual payments can be varied, within limits, up or down from these level amounts. Actual experience will differ from the estimates for this more exact valuation, but the differences should be much less for the exact valuation than for many valuations made for tax purposes. Such actuarial gains and losses for the exact valuation can be used to adjust the thirty-year period for the next exact valuation. These extensive valuations are probably needed only about once every five years.

After the true level annual costs have been determined to the best ability of the actuary and the employer has made a reasonable estimate of the contributions that he proposes to make for the next three or four years, valuation methods and standards can then be established for the valuations to support deductible contributions for the income tax return.

There are analogies for this proposal and the procedure used to determine gross premiums for nonparticipating life insurance. The gross premiums are calculated on realistic standards for death claims, expenses, terminations, and investment returns. Frequently a specified period, such as thirty years, is covered by the calculations and the value at the end of thirty years taken as the cash value or the cash value plus a surplus allowance. The valuations made for the state insurance departments for the insurance sold at the gross premiums so determined are made in accordance with the requirements of the insurance laws. The gross premiums have no simply defined relationship to the valuation net premiums.

Mr. Griffin states that an organization of undisputed permanence can properly fund a pension plan with contributions equal to the normal costs plus interest on the unfunded liability. He indicates that this is a minimum necessity to show "the true long-range costs of the benefits which have been adopted." I see no good reason for excluding social security from this test.

I understand Mr. Griffin's concern about ultimate overfunding of a pension plan. I doubt if there are many plans that are now overfunded, although, if contributions are continued at current levels, some of them can become overfunded. It seems to me that the greater danger currently

for many plans is underfunding, unless current annual contributions are increased in the future. Decreasing future contributions to avoid overfunding will usually be easier than increasing these contributions to prevent underfunding.

RICHARD DASKAIS:

The author has assumed that any year's pension costs (or charges against income for pensions) are equal to pension contributions for the year—that is, the employer is using cash pension accounting rather than accrual pension accounting. This is now the general, but not universal, practice in American pension plans.

It is quite possible that in the near future the principal recommendation of the Hicks report⁴ will be put into practice by accountants and that accrual pension accounting will become the rule rather than the exception. The pension contributions of an employer who accounts for pension costs on an accrual basis may be determined by considerations of employee security, opportunities for investment within and outside the pension fund, income taxes, availability of cash, and so forth. The employer need not stabilize contributions in order to stabilize pension-expense charges, since these charges are largely independent of contributions.

With accrual pension accounting, funding is divorced from accounting, and the reasons stated in the paper for a minimum *contribution* of normal cost and interest under the entry-age-normal method appear to become reasons for a *charge* of normal cost and interest.

BARNET N. BERIN:

To the outsider, one of the puzzling things about pension funding is how a particular method is chosen. The author is concerned with projected-benefit methods but evidently feels that the accrued-benefit approach may be a better measure of adequacy at a particular point in time. The questions of funding methods in general and of actuarial assumptions and their effects are not really covered. They both relate to concepts of adequacy.

In theory, at least, the choice of actuarial assumptions should be independent of the choice of funding method. Actuarial assumptions should represent appropriate estimates of rates of interest, mortality, turnover, salary scale, and disability, with rates of interest, turnover, and

⁴ *Accounting for the Cost of Pension Plans* (New York: American Institute of Certified Public Accountants, 1965).

salary increase related to the employer's probable experience. Once these are set, the funding method should be one of the six or more recognized methods which best meets the employer's objectives. All funding methods reach the same goal if we consider one employee whose retirement benefit is funded over his working lifetime. The employer's objective can lead to a funding method where the costs gradually rise (as a percentage of salary or as a dollar charge per life), where they are level, or where they gradually decrease. (The condition implicit here is that actuarial experience is exactly realized.) In the absence of an employer objective, the specifics of the case will shape the actuary's choice.

Once a set of actuarial assumptions and a funding method have been chosen, an analysis of experience gains and losses is essential. If one of the assumptions is poor—with continued actuarial losses leading to rising costs, that is, over-all losses—it should be changed. By annual examination of gain-and-loss components, the appropriateness of the assumptions can be checked over a period of time. In subsequent years, it may become important to lower costs, based upon changes in the actuarial assumptions, to meet benefit increases without changing the level of over-all costs or to enable the employer to skip contributions. Without a complete gain-and-loss analysis, such changes cannot be done in a professional manner.

The author refers to the cardinal principles of life insurance as supporting the "level premium" funding methods. This argument is weak. There are generally no surrender values comparable to life insurance policies' cash values in the funding of pension plans. The "risks" in life insurance are generally maximum at issue and decrease thereafter, while in a pension plan the "risks" gradually increase over the employee's working lifetime.

Some actuaries have felt that the accrued-benefit cost method—the unit-credit method—represents a reasonable approach to funding where a specific benefit is defined for each year of service. In practice, the accrued-benefit cost does not increase from year to year. Mr. Robert F. Link's discussion (*TSA*, IV, 665) concerning the unit-credit method and the average premium age is still relevant.

The author is concerned with the definition of accrued liabilities. The balance-sheet approach shown has the weakness that some of the asset items are at best *contingent* assets. It might be better to define the accrued liabilities as (1) - (2) and assets as (4), with the unfunded liability equal to (5). This approach can be used in all funding methods.

An interesting point is whether a stationary population will in fact ever occur. Is this concept an instructive one, or does it lead to confusion?

The accumulation of funds to back accrued benefits or to back vested benefits is a major distinction that implies very different financial objectives. Is the "vested benefits" approach feasible?

A discussion of these points would expand the material on the Part 9E syllabus and be helpful to the students.

OREST T. DACKOW:

The current dialogue now taking place in the pension area strongly suggests to me that within the next few years we will be faced with amendments in the provisions of the Internal Revenue Code dealing with pension plans. These amendments will undoubtedly reflect to some degree the recommendations of the President's Committee on Corporate Pension Funds and the ideas being put forth at the public hearings now being held by the fiscal subcommittee of the joint economic committee, headed by Representative Martha W. Griffiths.

It seems clear to me that utter chaos will result if it is decided to adopt one set of guidelines to ensure that pension plans follow some funding standards and a second, unrelated, set of standards through the Internal Revenue Code governing the employer's tax position in regard to his contributions to the plan. Those wishing to promote employee security would desire at least the funding of accrued benefits and preferably an even higher level of funding. The Treasury, on the other hand, might well feel that the maximum level of funding for which an employer should expect tax relief is the complete funding of accrued benefits. These probably diverse objectives in two sets of guidelines would make pension plan administration an even more complex matter than it currently is.

For those of you who believe that this is an idle fear, an unrealistic nightmare, I would simply remind you of the situation currently existing in Canada, where the provinces have jurisdiction over the funding standards with which pension plans must comply and the federal government regulates the employer's tax position. Under this dual set of standards, conflicts have arisen concerning the treatment of employer contributions to plans that are currently in an overfunded status.

The author concludes his paper by stating:

Increasing pressures for regulation, which come largely from sources unfamiliar with actuarial distinctions and the requirements for benefit security, place a responsibility on actuaries to provide appropriate definitions and to direct these pressures into the right channels.

I believe that this is an understatement of our responsibilities in the area.

DAVIS H. ROENISCH:

Mr. Griffin is to be commended and congratulated on his paper, particularly on making a clear distinction between the "actuarial liability" and the "cost of accrued benefits." It is easy to concur with the positions presented by his paper.

Several minor points might be noted. First, I have some comments with regard to terminology, since the terms that actuaries have used in the past to define their concepts may be the source of much of our difficulty with professionals in other fields. Thus, the term "actuarial obligation" is less likely to connote a debt which should have been paid in the past than "actuarial liability." The term "benefits earned to date" might well carry more meaning to non-actuaries than "accrued liabilities." While these changes in terminology are modest, they are advanced seriously, since the connotation of words often sets the emotional stage for discussion of funding requirements with non-actuarial groups.

The principal point of the paper is that the normal cost plus interest on the unfunded obligation calculated by the entry-age-normal method is usually adequate to fund the benefits earned to date over a reasonable period of time. Some caution is properly exercised by the author in moving from the individual case of an employee entering employment to the group which starts with employees at all ages. The strong funding position of most pension plans that have been in effect without substantial amendment over the last decade has come about primarily from favorable investment results and expanding employee groups.

Some reservation should be voiced on the author's statement (on p. 57) that the minimum contribution might fund a substantial portion of the unfunded cost of accrued benefits for a group of constant size in the absence of substantial experience gains. Unless such a group were immature, the author's Distribution III on a $4\frac{1}{2}$ per cent basis (shown on p. 61) would apply. In these conditions, very little funding of the benefits earned to date would be expected. It is true that the author qualifies his statement by saying that the contributions "might" reach this result, but, in the conditions that he cites, we believe that it would be more likely that very little funding would take place.

The value of the paper lies in its stress on the great complexity of determining the trend of funding for any given program. Not only do the benefit formula, actuarial technique, experience gains, and the trend in the size of the group play an important role in determining the speed with which the benefits earned to date are being funded, but the actuary's treatment of unrealized market appreciation and inflation must also be

taken into account. The treatment of these major imponderables has, as illustrated by the author in varying the interest rate, a very substantial effect on the appropriate contribution.

This suggests that other regulatory authorities might be best advised to satisfy themselves that the actuary has a reasonable basis for his determination of the outlays required to fund the pension plan and that this amount will adequately provide for the benefits earned to date after a reasonable length of time. Upon later review, the progress of the fund can be measured against the original assumptions, its current status compared to that which was predicted, and a conclusion reached as to the adequacy of the funding program and the prior contributions. If they content themselves with this, unsound funding procedures can be detected and highlighted without requiring the reviewer to take a course in actuarial science.

DORRANCE C. BRONSON:

"The old order changeth, yielding place to new,

Lest one good custom should corrupt the world."

TENNYSON, *The Idylls of the King*

Mr. Griffin has produced, for the most part with his usual clarity, a further interesting piece for the literature on pension funding in the United States. Observers of recent pension literature will probably agree that the stalagmite of writings on retirement and allied benefits has had abnormal cubits added to its height, through actuarial papers, professorial dissertations, proposed accounting dicta, governmental reports, and so forth.

A considerable increment in these recent encrustations to pension literature (to continue the simile) has derived from the writings of certain new authors whose ignorance of private pensions is patent. "A little learning is a dangerous thing" applies quite aptly to this type of writer. The precipitates they have left (with more coming) put colors, not seen before in the United States, into our measurement and appraisal of pension literature. To some readers, these new hues appear in the bright band of the spectrum, but, for others, they are at less-brilliant locations.

The "new" is with us, willy-nilly, serious or absurd. The *serious* category is headed by politicoeconomic innovations. Evolving from the New to the Fair Deal, and across the New Frontier, we are now attempting a traverse of the Great Society's high cliffs.

Another "new" of *serious* nature (alluded to later herein) lies in ter-

minological failures. A potent example is found in C. P. Snow's much-discussed *Two Cultures*. In this work, the British author is concerned with the widening dichotomy in the ability to communicate between two great cultural branches, say, Categories A and B. Category A represents today's more-than-ever arcane disciplines of the pure and applied sciences (within which we may include "New Math" for the kiddies, on up, but from which we must bar daddy's science fiction throwaways); Category B comprehends the *serious* liberal arts and humanities, as well as the less-serious fringes thereof.

Within said "fringes" of Category B, communication is also frequently difficult, but no one seems to care or write books about it; indeed, it may be cultivated as a defense mechanism! In this area, new oddities are proliferating at an increasing rate. As illustrative of "doings" in this fringe area for those of our readers who stay out of it, I will mention only three. First, the "New Art," which, the last time I looked, was replete with (a) canvas abstractions produced by splashed-on, or dripped-down, pigments and (b) collages ingeniously composed of arranged junk (cities should encourage). A second example is from the "New Theater," within the circuit of exponential "offs," measured from Broadway; there have been (and are, I am sure) certain weird *new* productions given from time to time. Last, closer to our own profession, one learns that "New Symphonies" have been composed by E.D.P. on magnetic tape (these are, no doubt, enjoyed by E.D.P. actuaries, who can applaud with great efficiency, in bursts of FORTRAN or COBOL).

And so it is, in this relatively small, antic fringe of Culture B; anything goes, provided you are not a Harry Hypotenuse (the sum of the Squares) who, in these purlieus, is abhorred as a Vacuum abhors Nature. Any restrained levity into which I may have lapsed for this paragraph, with respect to activities imputed to fringe areas of Culture B, has only been by way of aiding the characterization of one aspect of the times, A.D. 1966.

The writings on pension subjects by qualified actuaries are all of Culture A and, I believe, aimed at offering various types of improvement in the area of private pension systems as we know them. These actuarial writings are intended for the information of employers and/or unions, as well as for the actuarial audience. In contrast to said constructive aims, there have been a few "mushroom-type" authors, out of the B-fringe, perhaps, who—through ignorance or design—sharply criticize the private system and make concomitant proposals so drastic that I do not trust my

prose to stay in decent bounds when mentioning same but turn, instead, to those twin disciplines of meter and of rhyme:

This is a sorry Scheme of Things entire,
Let's grasp and shatter it to bits—and then
Re-mould it nearer to our mind's Desire.⁵

The "shatter and re-mould" ideas, held by what, I hope, is but a small minority, are the antithesis of Mr. Griffin's views. Indeed, his paper, launched from the actuarial science post in Culture A (far from the fringes of B), is thoroughly constructive in aiming—through his rule for minimum funding—at extending the area for "shatter-proofing" private pension plans. We all, I expect, strongly support such *aims*; more doubtful, though, is that such unanimity holds over to his *ways and means*. (This lack of full agreement is a result that I am glad to find, both because it would be a dull ending and in view of the principle that beneficial "fall-out" is shed by disagreement.)

I confess to having found some difficulty in harmonizing the author's ways and means with traditional principles of pension funding. It was not clear to me at first that Mr. Griffin was writing a rulebook on *minimum* funding tests and not a tract for his idea of the *optimum* basis. The promulgation of such a tract would, indeed, have clashed in sparky opposition with subjective optimums aimed at, or attained by, various employers and their actuaries. That is, the paper does not attack these precincts as its main purpose, although it may serve to induce second looks at the current funding of a given plan and at the preconceived viewpoint of its optimum. The foregoing part of this paragraph gives my capsule summary of the paper upon restudy of it; the author will correct me if I am wrong.

In previous talks, papers, and discussions thereof, several actuaries, myself included, have pointed out the increasing difficulty of communication, both among ourselves and—even more—with those outside. The pension terminology stands little chance of being standardized, I feel, in spite of the ambitious project of the committee on pension terminology, with which project Professor McGill and others are valiantly struggling. For instance, not infrequently, an actuarial author complains about the sad state of pension terminology and then, rather promptly, either sets forth his own definitions (sometimes *ad absurdum*) or charges ahead with undefined and/or undefinable terms, each of which begs the question of "What does he mean?" or "Is this the same as he meant on page so and so?" Mr. Griffin, fortunately for the reader, has not forced his definitions

⁵ With apologies to FitzGerald's fine *Rubaiyat*, for a few words deleted with mine "dubbed in."

on us; most of his terms seem clear without definitions. He *does*, right soon and right often, use the term "overfunded," the meaning of which he should have clarified, if he could, at the start. I note that Mr. Trowbridge, in the interesting educational paper he wrote for the *Harvard Business Review*, blames the actuaries, en bloc,⁶ for the alleged existing confusion of pension funding in the business community, because of our vocabulary (the "two-culture" syndrome of C. P. Snow apparently here, too).

To turn a moment to contemporary pension funding in Great Britain, where the early pioneering papers of King, Manly, and Epps found fertile soil, I observe that a paper, fairly recent (1961), entitled "Pension Fund Valuation under Modern Conditions,"⁷ brought out what the "new," over there, consisted of under said "modern conditions," namely, a reconsideration of interest rate assumptions, certain nontraditional asset-valuation techniques, and a sharp alertness to future inflationary potential effects on actuarial methods and assumptions; in short, no basic structural changes seemed to be proposed.

The "new" actuarial funding concept⁸ enunciated in part of Mr. Griffin's paper and in certain previous writings by him and others, puts, perhaps, a stamp of "update, needs revision," on several of my various papers, books, articles, discussions, and so forth. But I doubt the demand for this and shudder to envision the job of "revision"; hence, I will await events before getting out the scissors and the paste. However, though absent the time for rewrites just now, when Mr. Griffin puts such heavy emphasis upon benefit-security ratio and its component accrued-benefit value (with a finality equivalent, it would seem, to the Laws of Moses), recollections *do* come to mind of situations where, I am sure, there were "happier endings" from the regular traditional valuation methods that had been followed (overfunding, if you will) than would have resulted under a funding history by Mr. Griffin's criterion.

My allusions above to "revisions" of past writings and to "happier endings" lead me on to recall the following random items. These references are from my own writings (which is why they came so readily to mind relative to Mr. Griffin's paper):

1. I have felt no regrets with regard to the fairly strict rule on "actuarial soundness" for which I indicated preference in a book written in 1957.⁹ I did

⁶ This, I mildly resent—one of those shotgun blasts; for example, "We are *all* to blame for the Flood, or for such and such!"

⁷ By Geoffrey Heywood and Maxwell Lander, *J.I.A.*, LXXXVII, 314.

⁸ A concept really grounded on, but with gyroscope added, the *old* group annuity single-premium technique, is it not?

⁹ *Concepts of Actuarial Soundness in Pension Plans* (Homewood, Ill.: Richard D. Irwin, Inc., 1957).

not (and do not) feel sufficiently competent or omniscient to put forward, as the sole recommendation, any explicit single definition of the term "actuarial soundness."

2. In a paper written in 1949,¹⁰ the question was raised whether "industry, in general, could afford full funding objectives"; Mr. Griffin's paper may imply this question, also.

3. In another paper,¹¹ with respect to the *termination of a plan*, a sizable number of benefit formulas, conditions, and termination priorities were explored. In quite a number of these, the obligation for employer funding and/or for employee equity at death or termination of service would have been quite unmet or hard to handle under Mr. Griffin's criterion, which, as he says, confines itself to normal retirement pensions. Indeed, even had he widened his focus to benefits other than normal retirement date pensions, it is hard to visualize how a measurement of all values could have been computed year after year for these variables on the plan's "benefit matrix" without unwarranted actuarial detail, effort, and fees.

4. Mr. Griffin, perforce, could not cover the pension waterfront in his paper. However, a few of the elements omitted may be listed for illustration. The paper does not explore, with respect to his funding discussion, the matter of employee contributions (e.g., how much of the accrued benefit can be imputed thereto; are there other problems?); it also omits reference to Mimeo 5717 limitations under his "closeout" value concept; and it has no allusions to any possible reshuffling of "rights" or allocations in respect to the fund or contract under special situations, such as for the euphemistic "actuarial error" or the "draw" caused by lump-sum commutation or by "freezing" certain funds through guaranteed priority (rare) of vested terminations.

5. In a paper on mergers,¹² I pointed out the probable superior position of the company which had a higher "funded ratio"¹³ than did the other company. Having later seen this very sharply brought out in practice during merger negotiations, and involving large sums of money in settling on "price," the said "superior position" impressed me greatly.

6. Last, Mr. Griffin mentions, in his final paragraph, and rather *en passant*, the possible "improvement of benefits." It appears to me, however, that, in view of the pension history over the last twenty-five years, he has understated the situation and, while he may be correct on the plateau now reached for *pension* formulas, these are neither *dollar amounts* nor the limit-of-benefit *types* possible. There surely have been great advantages and help to employers (and indirectly to employees) when benefit levels were raised, or new types added, in the existence of a valuation position which was "overfunded" under Mr. Griffin's

¹⁰ "Pensions, 1949," *TSA*, Vol. I, No. 1.

¹¹ "Pension Plans: Provisions for Termination of Plan," *TSA*, Vol. VIII.

¹² "Pension Plans under Corporate Transfers" (mimeographed paper presented to the Council on Employee Benefit Plans at New York City, October 16, 1959).

¹³ A different measure from the paper's "benefit-security ratio."

concept of the term (a term which, as mentioned earlier herein, is not clearly defined in the paper).

In the very weight, by number, of actuaries (perhaps a record) discussing this paper, the interest in and importance of Mr. Griffin's toils are evident. My own discussion is one of neither complete praise nor really critical derogation but, rather, has been set down from a quizzical, ready-to-be-converted stance. In view of the preceding sentence, it may seem paradoxical for me to say that I think Frank's paper, per se, is excellent. Sincere writings in the actuarial field are, in general, educational and thought-provoking, and, in this paper, wherein "new" funding angles provide a liberal sprinkling of Accent to sharpen our taste, the author has served us a spicy dish.

* * *

To close with asterisks might indicate some terminal omission. Let me, then, expand on what I call Mr. Griffin's "parable of the mountain."

A postlecture inquiry was put to Mallory,¹⁴ the famous British climber, on *why* he wanted to climb Mt. Everest. Those of the departing audience close enough to hear the question broke out into laughter. "But, Mallory didn't laugh. He stood there . . . a little while, thinking out his answer. And then he told them, 'I want to climb it,' he said, 'because it is there.'"¹⁵ This response, extemporaneously expressed in less than ten words, has magnificent simplicity and breadth; it serves, cogently, to explain a multitude of human actions far removed from mountain heights.

But I must descend from dramatic altitudes to the pragmatic level. I inserted this vignette of Mallory's classic answer because it struck me that Mr. Griffin's paper rather invited it. Specifically, at the end of the first section, he uses a paraphrased (suitably) version of "the Mallory response, *sans pareil*," as the basis for his parable of the mountain.

The mountain (*actuarial liability*) "is there," and, traditionally, actuaries have led expeditions (amortization) to, or toward, the summit (100 per cent "funded ratio"). But in the paper, the author asserts, in

¹⁴ George Leigh Mallory attempted to climb Mount Everest three times (1921, 1922, and 1924). The last climb capped his already spectacular feats with legend. After a stop, relatively near the summit, he and a companion, Irvin, accepted the final challenge and set off for the unconquered top. Watchers saw their upward trek until the two disappeared from view into the upper mists, and clouds and ice and silence. "Disappearing from view" was "disappearing forever." Many feel that they attained the summit ere some catastrophe of the heights made fatal its strike, obliterating, for man, all traces of these brave men.

¹⁵ As described in *The White Tower*, by James R. Ullman (Philadelphia and New York: Lippincott Co., 1945).

effect, that the upward struggle is not really needed after all; there is, instead, a path (the "minimum funding" rule of the paper) *around* the mountain. Thus, many actuaries, whose eyes and minds have been busy seeking the upward trail, have overlooked the meadow route.

To this parable, there is this short addendum. Mr. Griffin, as I discussed earlier, would, as chief ranger of the region, set up no barriers or fences or any signs of "No Trespassing," against such actuaries as are upward bound. The implications of the paper, however, *do* give one (me) the feeling that the ranger has let the paint flake and grow dim on the arrows to the upward trails, while keeping those to meadow paths distinct and colorful.

And thus my discussion (rambling and digressive) comes to a close. One note alone remains, purely subjective. Both as a mountain amateur, when younger, and one with stubborn habits and conceptions (plus, I believe, a certain body of experience), I must declare that I prefer the climb, bearing in mind, before striding off, that—as it was said of old—"there are many paths (funding methods) to the top."

DOUGLAS H. MILES:

I welcome Mr. Griffin's paper to the Society of Actuaries and regret that distance will prevent my attending the discussion. I would like, however, to make certain points as comments on what is said in the paper.

In Great Britain, I have found it important when considering funding theory to consider the theory separately in relation to average salary and final salary plans. In considering final salary plans, moreover, most conventional ideas go overboard if the salary-scale increase exceeds the rate of interest used, but space prevents consideration of this here.

On the whole, it seems to me that the arguments used in Mr. Griffin's paper refer principally to average salary plans, and most of the remarks that follow also relate to these. He refers on page 55 to mature funds, and the concept of a stationary fund is useful to bring out one point. In the position of a stationary fund, the fund under unit-credit funding is smaller than the fund under prospective methods of funding (which apparently are termed "projected-benefit cost methods" in the States), the difference being (Present value of future service benefits for existing members) *less* (Present value of future contributions).

At this stage, the unit-credit cost is higher because interest on the smaller fund is less (Pensions = Contributions plus interest on fund), but at an earlier stage prospective methods have the higher cost, because a larger fund is being built up.

In Great Britain, it is the usual practice to have valuations once in

five years, although this is sometimes reduced to three. One has to set a rate of contribution, which can be maintained for at least that period and usually longer, because, once a rate of contribution has been established, it is always easier to reduce it than to increase it.

Traditionally, our methods of funding have been attained age normal cost. This has the merit that it is safe, as the rate of contribution tends to fall as new entrants at lower ages are brought in. For average salary plans, however, competition from insurance companies using single-premium costings has forced some hard thinking; it is useless to argue that the unit-credit method will eventually result in higher costs, because of the way that wages and salaries have increased since the war, with the result that virtually every fund, however old, is in fact very much in the early build-up stage. (In this respect, I would mention that we recently valued a fund that has been in force for thirty-five years and has doubled in size in the last five years.)

One method which we have used for average salary plans has been to calculate the entry-age-normal cost plus the interest on the unfunded past-service cost and express the result as a rate of contribution. As new entrants are brought in, this means that the initial past-service cost gets paid off (except in the case of a declining fund), so that on Mr. Griffin's definition the plan would be overfunded. Such a contribution, however, is usually smaller than the unit-credit cost plus the annual cost for past service paid over twenty years, so that the excess is not great.

However, there is one occasion where prospective methods of funding are needed, namely, where a fund is closed to new entrants but benefits for existing members continue to accrue. This possibility is sometimes used to justify initially a higher rate of contribution than would otherwise be called for; but such a rate of contribution need not be pressed if the employer appreciates that circumstances can arise where the rate of contribution may have to be increased.

And this brings me to the crux of my remarks, namely, that, provided the employer fully understands the position, it is possible to offer alternative immediate costs between which the employer can decide, dependent on his financial position at the time and his prospects in the future. This is not to say that one will always agree with the rate of funding adopted. Sometimes, however, the employer deliberately adopts a fairly high rate of funding, but, when it becomes possible to reduce the rate of contribution, instead of this he uses the surplus on the valuation to augment the benefits for earlier service. By this means it may be possible to have a final salary plan in practice without the guarantee that such a type of plan normally involves.

Final-salary plans present the different problem that salaries in recent years in Great Britain have been increased at rates substantially higher than have been allowed for—8–10 per cent per annum in many cases. For the most part, therefore, any margins built into the rate of contribution from whatever source have been welcome toward meeting the cost of these increases.

(AUTHOR'S REVIEW OF DISCUSSION)

FRANK L. GRIFFIN, JR.:

It is a generous custom which gives the author the last word, especially in the face of an array of experts such as have chosen to comment on this paper. To all of them my thanks for the interest, the time, and the effort which have gone into their discussions, especially those who have expanded upon my theme in bringing out additional relationships, conclusions, and exceptions.

I am pleased to have drawn a discussion from across the Atlantic and wish to thank Mr. Miles for having provided background on practices in Great Britain. There are, of course, many similarities to practices in the United States, even similarities in terminology. His reference to employers' sometimes deliberately adopting a high rate of funding and later converting excess assets into increased benefits is one which has frequently been duplicated here. Likewise, his reference ". . . it is possible to offer alternative immediate costs between which the employer can decide, dependent on his financial position at the time and his prospects in the future" strikes a familiar chord in consulting actuarial practice here.

I hope that Mr. Miles and his British colleagues understand that the guidelines in the paper are not intended to suggest an optimum upper limit on the funding which might be recommended by the actuary or which an employer might choose to do for reasons of his own. Rather, they are intended to suggest the maximum which should ever be *required* if regulation of pension funding should come to pass. These are, of course, two very different things. Contributions in excess of those designed to reach the dual objectives cited in the paper are certainly not proscribed by its language.

My colleague Lambert Trowbridge, with whom I have long been associated on projects related to the private pension movement, has come up with another of his clear expositions in testing certain of my conclusions against findings developed from "models" in his classic paper "Fundamentals of Pension Funding" (*TSA*, Vol. IV). (To those who may not be aware of his article in the *Harvard Business Review* [March–April, 1966], entitled "ABC's of Pension Funding," or who have not yet had an

opportunity to read it, I highly recommend the article as a significant contribution to better understanding of pension funding by the layman.)

I am happy to see that, for the most part, Mr. Trowbridge finds our conclusions consistent. Such differences as exist are largely matters of interpretation or emphasis. While there is no point in an extended discussion of these, it is well to stress again that changes in the actuarial assumptions which may be appropriate in establishing values upon termination of a plan—mentioned in the paper and commented upon by Mr. Trowbridge—not only include changes which may increase costs (such as the elimination of any turnover discount) but also may include changes which will decrease costs (such as a cutoff of salary-scale projection in any plan whose benefits depend on compensation and the possibility that higher interest assumptions would apply to close-out rates, as is true at the present time).

Mr. Trowbridge apparently is not kindly disposed toward projections extending over a score of years or more. While I would be the first to agree that such projections contain substantial unpredictable elements, the same is also true of the projections inherent in an actuarial valuation. I do not believe these uncertainties (on which actuaries apparently thrive!)¹⁸ constitute a serious objection to the making of projections, when it is borne in mind that these, like actuarial valuations, are adjusted to the facts as they evolve from year to year.

Mr. Trowbridge points out that certain illustrations in the paper involve the use of interest gains to accelerate the amortization of the unfunded cost of accrued benefits. He also comments that while this “seems reasonable and practical, it is not clear that it would fit the usual interpretation of IRS regulations.” This latter comment may create the impression that Treasury Department attitudes would be unfavorable to the use of gains to amortize unfunded costs rather than to reduce contributions. Bearing in mind that it is the maximum tax-deductible contribution with which the IRS is primarily concerned in the application of gains, we should find no problem so long as the contribution claimed as a deduction does not exceed the maximum. The illustrations in the paper would, I believe, satisfy IRS requirements.

Two other close associates in pension and Society affairs, Pres Bassett and Fred Sloat, have also contributed significantly to the value of this paper with their discussions. Fred Sloat, who has perhaps the closest relationship to the accounting profession and who did more than any other individual to lead the Accountants Research Staff through a maze of actuarial technicalities on its way to the publication of *ARB No. 8*

¹⁸ See *Fortune* (December, 1965, and January, 1966).

(the Hicks report), oriented his remarks to questions of accrual accounting for pension costs—in particular to the manner and extent of charges for so-called past-service costs. It is a timely contribution in view of the exposure draft on pension cost accounting to be released in August, 1966, by the Accounting Principles Board for review and comment. He has also provided us with interesting background relative to the evolution of actuarial cost methods in group annuity and trust funding.

Pres Bassett stresses the importance of funding flexibility to the sound development and financing of private pension plans, a view with which I agree entirely. I trust that there is nothing in the paper to imply that a rigorous pattern of contributions need be followed in order to reach the long-range funding objectives set forth therein, for such was certainly not intended. Mr. Bassett also logically expands the concepts of funding adequacy to encompass variations in the rate of funding according to the level of benefits in different situations. This is commented upon shortly.

Jack Dyer touches briefly on the same two points. He also expresses some reservations with regard to accrued-benefit concepts, for which he draws on an experience involving a change from a final average salary plan to a career average salary plan. The method followed in the case he illustrates apparently was selected deliberately on the generous side for industrial relations reasons and presumably because the company plan was *continuing* rather than terminating. Had it been a *terminating* plan, I feel that Jack would agree that it would have been impossible to justify promoting benefits to a compensation basis higher than employees had ever earned up to that time. Jack's example deals with a continuing plan and clearly does not relate to the accrued-benefit concept on termination of a plan, which, of course, is the sense in which the accrued-benefit test of adequacy is used in the paper.

Whatever the problems encountered in defining accrued benefits, we should avoid falling into the semantic trap of "benefit expectations," which has become a favorite expression of certain writers who have been urging compulsory vesting as well as strict regulation of funding. Arguments based on subjective "expectations" (often entirely unrelated to the rights conferred by the terms of a plan) serve to derail objective thinking on the pension question and to provide grist for the political mills. I interpret certain of Mr. Dyer's comments as making the point that those who wish to elevate expectations into legal rights may improperly cite portions of the paper in furtherance of their aims. If so, this would be most unfortunate.

I agree with Jack that care should be exercised to avoid statements which can be lifted out of context and used to support arguments by those who wish to impose statutory limitations on pension funding, whether these limitations are concerned with maximum or with minimum funding. Still, it is difficult to see just what can be done to protect one's self fully against this possibility. Remaining silent is certainly not the answer, despite the curious fact that one frequently finds the same reference cited in defense of opposing viewpoints.

Referring to certain comments by Messrs. Bassett and Dyer, as well as by Dorrance Bronson, I agree that there are circumstances where deliberate "overfunding" of a pension plan should be considered. One circumstance in which heavier funding might be desirable would be the existence of a period of unusual company prosperity, during which a cushion could be built against a possible subsequent period of poor profits or company decline. I am not quite as sympathetic to the argument that the "inadequacy" of current benefit levels (however this may be determined) dictates heavy current funding. The very smallness of the benefits may, of course, make more *practical* their rapid funding in some situations, but under a union plan a heavily funded position may itself precipitate benefit demands. It seems to me that to use the argument of benefit inadequacy as a compelling reason for a higher level of funding is just another way of saying the actuary should in fact value benefits which have not yet come into being.

The argument of benefit inadequacy implies the existence of set standards for all plans, when there are none. In any given situation an assessment of existing benefit levels will depend on many factors, some of them largely subjective. Is it the function of an actuary, or of the employer, or his unions, to decide that existing pension provisions are inadequate? Surely this involves an economic or business decision, not an actuarial one. I agree with Mr. Bassett's statement, "It may not be the job of the actuary to answer these questions, but it is certainly the actuary's responsibility to be sure that the client understands the implications of these questions."

Moreover, in deciding whether advance provision should be made for possible future escalated benefits, a number of related questions must necessarily be raised, including (a) whether the company should attempt to justify the costs of tomorrow's plan today; (b) whether investment considerations and the changing value of the dollar would make one course preferable to the other; (c) whether future changes in social security benefits may reduce the need or pressures for increasing the private plan's

benefits; and (d) whether stockholders would look favorably on any substantial overfunding which may later prove to have been done unnecessarily.

Paul Jackson corrects my oversimplification to the effect that "there need be no basic conflict between a company and its employees in the funding of a retirement plan." It is clear that there can be a conflict, although this is by no means necessarily so. I believe that it is well to recognize two factors which today bring these interests close together. The first is the fact that most funding decisions are made by management *employees* who have a personal stake in the success of the company's retirement plan. The second is that the financial welfare of the company is also vital to employee security, whether this relates to job permanence, pension funding, or pension plan permanence. The two interests are thus linked. The funding flexibility which may be vital to a company may also give the employee greater assurance of plan permanence even though the flow of contributions into the pension fund has temporarily been slowed.

I agree with Mr. Jackson's observation regarding the inadequacy of most salary-scale assumptions today (for which there are generally good reasons, it may be noted). Observations about salary-scale deficiencies are apt to be somewhat misleading within the context of this paper, however, unless one distinguishes between the effect of a salary scale on the achievement of the respective funding objectives for a terminating plan and for a continuing plan. The greatest impact of a salary-scale deficiency is on the funding for the continuing plan, and it will have considerably less effect on the adequacy of funding for accrued (or vested) benefits in the event of plan termination. Under a plan calling for the use of a salary scale in the valuation, the accrued benefits on termination, being based only on pay to that point of time, are, of course, less than a pro rata part of the projected benefits at retirement. Previous funding with a salary scale (even if deficient for a continuing plan) will generally have been done on the basis of assumed final pay higher, on the average, than actual pay achieved at termination date. Therefore, benefit security upon termination may be substantial in relation to the years of funding.

Walter Shur, whose skilful and searching appraisal of the financing of federal retirement systems appeared in *TSA*, Volume XVI, has given us some interesting comments on recent recommendations of the Cabinet Committee on Federal Staff Retirement Systems relative to improved funding of the Civil Service Retirement and Disability Fund. He mentions a connection between these recommendations and those of the President's Committee on Corporate Pension Funds (etc.). Whether there should be a "double standard" in the funding of benefits for employees

of public and private institutions is a moot question. At any rate, he and a number of other actuaries have raised their voices in support of what the paper terms "truth in labeling" of the costs of plans for public employees.

It is interesting to have Mr. Niessen's comments relating to funding in the "public" field. Even though it is an unintended result from the author's viewpoint, I am glad that he finds the paper useful in supporting the funding practice which has been followed by the Railroad Retirement Board. Apparently the funding of railroad retirement benefits is proceeding on a sounder basis than the funding of benefits for federal employees.

Messrs. Krinsky and Elkin, in their joint discussion, have added some strong arguments against legislation of mandatory vesting provisions and regulation of the funding of private plans. I wish to register my agreement with their arguments, especially those relating to benefit priorities in the establishment of plans. While these points may be self-evident to most pension consultants and actuaries, they nonetheless seem to have escaped those who are most vocal in their promotion of such legislation and regulation.

These two gentlemen also point out a basis for logical variation in the period of amortization of accrued-benefit costs, according to permanence and stability of employment in an industry or in an individual company. These observations are quite in keeping with the long-range objectives and concepts set forth in the paper.

Messrs. Krinsky and Elkin introduce alternative interpretations of accrued benefits, using as their example a plan providing a definite benefit per year of service with a maximum limit on the service credited. A decision as to the applicable alternative in a plan of this kind usually does not pose a serious problem, since most plans with early retirement provisions make clear whether or not a proration of the maximum benefit at normal retirement date is intended at an earlier date, when more than the maximum number of credited years would have been rendered at normal retirement date. The coming Pension Research Council study of benefit security sets forth in its methodology a logical method of determining accrued benefits, based in large part on the terms of the early retirement provision in the particular plan. Misunderstandings arise over this point, it is true; I have recently testified in a court case involving this question. I have found that those whose familiarity with pension plans extends primarily to plans for public employees, where retirement on full benefits is frequently permitted after a given number of years of service regardless of age, tend to relate accrued benefits under private plans to the different standards with which they are familiar.

Mr. Feay's discussion unfortunately aims beyond the boundaries and

purposes of the paper. Nonetheless, it is interesting to have his comments. The paper was not intended as a treatise on all aspects of pension funding; as was stated on the first page, "The purpose of this paper is to examine certain funding guidelines. . . . It is concerned with principles as well as with the broad impact of actuarial assumptions and cost methods but is not concerned with specific application of the latter." Thus, the illustrations were kept simple and were limited to plans providing normal retirement benefits (including, if you will, actuarially equivalent early retirement benefits and vesting in the form of deferred retirement benefits). The fact that the paper does not mention expenses, or disability benefits, or special early retirement benefits, or optional pensions, or employee contributions, or Mimeo 5717 problems, is consistent with its fundamental purpose.

On one line of reasoning, Dick Daskais' concise comment (on contributions and funding versus charges and accounting) disposes of funding objective *b* of the paper as part of the dual long-range objective—that is, provided accrual accounting for pension costs becomes standard practice (as seems likely) and provided *also* that funding thereafter is completely divorced from the costs for accounting purposes. While it is true that funding could be so divorced under accrual accounting and that there may be many situations in which it would be advantageous for companies to do so for reasons related to those enumerated by Mr. Daskais, I join many other actuaries in the belief that funding will tend to follow or parallel the accounting charges, especially if IRS limits continue in substantially their present form and certainly if compulsory funding standards should become a reality. In any such event, it will still be correct to think in terms of the dual objectives set forth in the paper.

Mr. Berin rightly stresses the importance of actuarial assumptions. This does not happen to be a primary subject of my paper except to the extent that different assumptions were pointed out to be appropriate in the case of a terminating plan and a continuing plan, respectively. That the choice of assumptions should theoretically be the same regardless of funding method may be true for a continuing plan, but it is no longer true when that plan terminates. This dual measurement is, of course, at the heart of the paper.

There are several minor points in Mr. Berin's discussion with which I do not agree, and I will but mention them. First, I do not fully agree with his oversimplification that "all funding methods reach the same goal," unless one is prepared to define the goal, in the ultimate, as no remaining funds and no persons owed benefits. Second, I believe that he has misinterpreted my reference to "cardinal principle in individual life insurance

funding." Third, I am afraid he is incorrect in generalizing that "the accrued-benefit cost does not increase from year to year." In practice, many factors can and do invalidate the latter statement, one of the most important of which is the effect of the benefit formula in changing the weighted cost age over the years.

Mr. Dackow expresses a concern which has been in many minds since the commencement of agitation for compulsory minimum funding standards under private pension plans. As he points out, we may some day be faced with conflicting governmental requirements if limitations imposed for different purposes are not geared logically to these differing purposes. Otherwise one bureau may complain of too little funding, while another seeks to restrict it. Mr. Dackow points out a comparable situation in Canada, where a dual set of standards has created conflicts.

Mr. Roenisch suggests consideration of a new term—"actuarial obligation"—as a substitute for "actuarial liability," since the former is less likely to convey the impression of a debt. Others may prefer "actuarial deficiency" or some other term, but in any event there is merit in the suggestion that "liability" be dropped. Mr. Roenisch makes a reservation with respect to the funding accomplished by IRS minimum contributions, other than for an immature group; this conclusion was also stated in connection with the illustrations near the end of the paper.

I am completely sympathetic with the views expressed in the last paragraph of Mr. Roenisch's discussion, relative to the basis on which regulatory authorities might best satisfy themselves as to the adequacy of a funding program. Actuarial certification by *accredited* actuaries, along lines similar to those which he has suggested, could provide the answer.

Almost any response would be inadequate to the nostalgic literary journey on which Dorrance Bronson has taken us in his discussion of the paper. It should be unnecessary to remind one such as he (whose own prolific works are milestones in the pension literature) that the "new" does not supplant the "old" but merely supplements it.

I am glad that Mr. Bronson has uncovered the intended emphasis on *minimum* rather than *optimum* funding guidelines and that he has also divined my purpose in presenting the matter in this way. If the presentation of the guidelines was more forthright than one would find in a "pro and con" answer to a Fellowship examination, I should think this appropriate in the circumstances.

Turning to specific points in his discussion, Mr. Bronson feels that the term "overfunded" should have been given a specific definition in the paper. I had assumed that the definition of "fully funded," given near

the beginning of the paper, took care of the matter adequately—that is, “overfunded” being anything in excess of “fully funded.”

Mr. Bronson sets forth six principal comments (including mental reservations in some cases) on the guidelines given in the paper, based on his own previous writings and conclusions. In answering each of these, I do so in the knowledge that our views are actually much closer in fact than may appear from the different emphases that we have placed on certain points.

1. I agree wholeheartedly that Mr. Bronson’s definition of “actuarial soundness” on page 14 of his well-known book *Concepts of Actuarial Soundness in Pension Plans* is a reasonable and workable one; in fact, I have recently had occasion to use it to advantage in a court case. There is no conflict between this definition and the concepts discussed in my paper.

2. Seventeen years ago, Mr. Bronson raised the question whether “industry, in general, could afford full funding objectives.” Mr. Bronson’s thought here is not directly related to the ideas in the present paper or even a motivation therefor. There may possibly be a parallel, but, if so, it is somewhat obscure.

3. Whether, as Mr. Bronson implies, a number of situations explored in his paper “Pension Plans: Provisions for Termination of Plan” (*TSA*, Vol. VII) would have produced unsatisfactory or awkward results if measured against the criteria of my paper would, of course, depend upon whether similar principles were followed in funding the supplemental benefits on death or termination of service. For reasons of simplicity, my paper dealt only with the funding of age-retirement benefits, but its principles could be expanded to include the funding of other types of benefit as well.

4. Mr. Bronson appreciates that the paper could not cover the “pension waterfront” in the matter of supplementary benefits and special situations. His listing of such situations will be helpful to those desiring to pursue the matter further.

5. In connection with the interesting example given with respect to mergers, it seems clear to me that a price had been paid for the “superior position” which one of the companies apparently enjoyed in the negotiations, namely, a price equal to the additional contributions paid in past years to establish the higher funded ratio, and that such position was not merely a “free” and automatic bonus of a particular cost method.

6. With regard to the advantage cited for overfunding as an aid to the financing of increased benefits at a later date, I have already made reply to Messrs. Bassett and Dyer on this point. There may well be a question whether it is an advantage, or even appropriate, to overfund one system of benefits in order to be better able to afford an expanded system later.

Finally, in Mr. Bronson’s interesting account of the Mallory incident, he has chosen to alter the meaning of the “metaphor of the mountain,” as used in the paper, turning it skilfully in defense of the ideal of complete

funding of "actuarial liabilities," no matter by what method these may be determined. I really cannot let this pass without comment. The "path around," which I suggested as an appropriate route to pension security for the funding caravan, circumscribes not the whole mountain *but only the peak*, which in this case represents the permanent excess of "actuarial liabilities" (as illustrated in the paper) over the "value of accrued benefits."

While I share with Dorrance Bronson an admiration of that indomitable spirit which accepts the challenge of a mountain "because it is there," as well as a taste for the adventure of the climb, still, in the sense in which the metaphor was introduced in the paper, I remain keenly aware that it is not we, but our clients, who must finance the expedition and take the risks.

In bringing these lengthy remarks to a close, I should like again to express my appreciation to all of the actuaries who have prepared discussions of the paper.