reached, but Treasure Salvors' operation "is committed towards gaining as much archeological information as possible in the time available," Fisher says.

While controversies of one sort and another rage above the surface, Fisher and his team are pursuing their 7-year underwater treasure hunt to what they hope will be the richest find ever made. On a single day early last month, divers brought up three more gold bars and two gold chains, each 6 feet in length. Meanwhile a magnetometer team has begun to prospect a few miles west of the *Atocha* site for the *Marguerita*, only half salvaged by the Spanish. Because of his remarkable perseverance, Fisher may well be thought to deserve whatever he finds. Certainly it is his by legal right. But the people of Florida probably deserve from their legislators a surer protection for their archeological heritage.

—Nicholas Wade

TIAA-CREF: for Richer, for Poorer, Married to the Market

For the TIAA-CREF* participant counting on the college pension plan to provide a margin of comfort in retirement, a reasonable reaction to the recent enactment of a federal pension reform law is a feeling of being a little ahead of the game. Major provisions of the law designed to guarantee an individual's rights to pension benefits he has earned are already embodied in TIAA-CREF programs.

Other developments, however, are a lot less reassuring. Inflation in recent years has outrun the growth of TIAA-CREF investments, and in the last 2 years the dollar value of CREF annuity units, on which CREF retirement income is based, has declined by a quarter.

The hypothetically average TIAA-CREF policyholder is probably vague on details of the pension plan and on how the current travail of the investment market affects the plan. But the events of the past 2 or 3 years are dramatic enough to justify his taking a keener interest.

TIAA and CREF are separate programs based on different kinds of investments and intended to complement each other. TIAA concentrates on investments which bring a fixed return—bonds, mortgages, real estate. The high interest rates of recent years have had a relatively favorable effect on TIAA payouts. The CREF portfolio, on the other hand, consists almost entirely of common stocks. The rationale is that CREF will provide a retiree with an income tied to the performance of a diversified portfolio of securities and that the long-term trend of the market will be favorable. It means accepting the downs as well as the ups of the market, and CREF is sharing its current unpleasant experience with other pension funds and mutual funds. (The average policyholder splits his contributions between the two programs on the theory that TIAA and CREF have compensating strengths and weaknesses under differing market conditions.)

TIAA and CREF, therefore, are doing what they were designed to do. This, of course, is not much consolation to retired people watching inflation erode the buying power of the dollar while their income from CREF actually shrinks.

The TIAA and CREF investment policies that by and large have worked well for two decades are, temporarily at least, limping in an economy beset by high rates of inflation and unemployment, a depressed stock market, and major uncertainties about energy and food prospects. The question for TIAA-CREF participants, put simply, is whether the strategy governing TIAA-CREF in the past will prove efficacious in the conditions now emerging.

TIAA, established in 1918, is a mutation from a free pension plan for college teachers created in 1905 through a $10 million benefaction from Andrew Carnegie. With the expansion of higher education, it became clear that private philanthropy could not sustain the program, and a study made in conjunction with leaders in education produced the design of a private pension plan financed through contributions from faculty members and other employees of colleges and universities and from their institutions.

The TIAA participant holds a contract directly with TIAA which makes it possible for him to move from one institution to another and even to leave the profession without losing rights to benefits he has accumulated. The program is "fully-funded" in the sense that benefits to him are based on the flow of contributions over the participant's career and on the investment experience of the program. These features of "vesting," "portability," and avoidance of unfunded obligations anticipated the new federal pension reform law. The compromise measure enacted into law includes fairly modest vesting and funding provisions, but lacks effective portability requirements of the sort incorporated in TIAA and CREF.

When a TIAA participant retires, an annuity is purchased in his behalf which guarantees a fixed dollar income plus dividends that are decided on annually by the TIAA trustees. This year the return to a retiree on his TIAA accumulation was 7½ percent. (Total assets of TIAA were about $3.4 billion at the end of 1973 compared to $3.0 billion at the end of 1972.)

CREF is a newer program which was itself, somewhat ironically, a product of inflation. During the 1930's depression, TIAA retirees fared reasonably well because prices were low and stable. After World War II, however, rising prices put pressure on people living on fixed incomes. To come to terms with postwar conditions, the concept of a "variable annuity" was developed and became the basis of the CREF program, established in 1952. The study which provided the blueprint for CREF was directed by William C. Greenough, now chairman of TIAA-CREF, and a major influence in the organization over the years.

When a CREF participant retires, his "accumulation units" are converted to a fixed number of "annuity units" by a formula based principally on his record of contributions, age at time of retirement, sex, and retirement plan chosen. The dollar value of an annuity

* Teachers Insurance and Annuity Association and College Retirement Equities Fund.

Changes in Energy High Command

President Ford on 29 October announced a reshuffle of his top-echelon energy chiefs to fill posts created in the newly enacted Energy Reorganization Act (*Science*, 25 October). The most conspicuous events were the departure of energy administrator John C. Sawhill, which had been rumored (see page 511), and the appointment of Atomic Energy Commission chairman Dixy Lee Ray to be Assistant Secretary of State for International Environmental and Scientific Affairs, which came as at least a mild surprise.

Named to head the new Energy Research and Development Agency (ERDA) is Robert C. Seamans, Jr., now president of the National Academy of Engineering and a former Secretary of the Air Force. Seaman's appointment to the ERDA post has been rumored for some time. Former astronaut William A. Anders is Ford's choice to head the new Nuclear Regulatory Commission, which will consist mainly of the regulatory elements of the AEC. Anders is now an AEC commissioner but has not specialized in regulatory matters.

A widely held impression that Interior Secretary Rogers C. Morton has gained a dominant voice in energy matters in the Ford Administration appeared to be confirmed by Ford's remark that he had decided Morton "ought to have a right with my approval" to make changes in the ranks of federal energy officials.

Ford said there was no conflict with Sawhill on policy matters, although there might be "differences in approach and technique." Sawhill "will be offered a first-class assignment" elsewhere in the Administration, said Ford.

Dixy Lee Ray's appointment to the State Department will put her in charge of a new bureau with authority over oceans, fisheries, and population matters, as well as environmental and scientific affairs (*Science*, 13 September).—J.W.

unit varies for any year according to dividends and changes in the market value of total CREF holdings.*

The market value of CREF investments fell by almost $400 million to $2.6 billion between the end of 1973 and the end of June. The value of annuity units which the annuitant receives has fallen from $35.75 in 1972 to $26.21 this year. Unless the market recovers strongly before next spring, when the annuity unit value is set, another cut appears likely.

The decline in two consecutive years, which amounts to a loss of more than 26 percent in CREF income to the retiree, is obviously a serious one. It is worth noting, however, that the $35.74 figure was the highest since the annuity unit value was first established at $10 in 1952. The value set for 1970 was $28.91 and, for 1971, was $30.64.

Since CREF managers are committed by terms of the program to buying securities in good times and bad and since premiums amounting to about $100 million pour in on every business day, CREF is always "in the market." This means that CREF has been buying stocks at the recent low prices. Some other major institutional investors have virtually dropped out of the market, which has apparently driven prices down further. If the market rebounds vigorously, CREF will have bought itself some real bargains; if not, not.

By the same token, it is advantageous for the individual participant in CREF if stock prices are low during his "pay-in" period and high during his "payout" retirement years. Many retirees now find themselves in reverse circumstances.

TIAA-CREF, which also offers insurance and major medical programs, thoroughly dominates its field. Faculty in 80 to 90 percent of private colleges and universities participate, and TIAA-CREF is now offered as an option in about 40 percent of public institutions. In all, some 2700 nonprofit organizations, including schools, private foundations, and research institutions are signed up. About 400,000 individuals belong.

Despite this wide acceptance, TIAA-CREF is not without its critics and questioners. The most extensive recent critique of the program was carried out by the American Association of University Professors (AAUP). This effort seems to have been prompted primarily by an article in the autumn 1971 ***AAUP Bulletin*** titled "A reevaluation of CREF," which questioned CREF's investment performance and by a letter in *Science* (11 February 1972) which was primarily critical of CREF payout practices. At the AAUP meeting in the spring of 1972, the membership voted to form a subcommittee to take a critical look at TIAA-CREF management and operations. This subcommittee, made up of four university economists and an AAUP staff member with a background in mathematics returned a generally favorable verdict in a report which appeared in the summer 1973 *Bulletin*. The subcommittee's evaluation of the investment performance of the two programs is indicated in the following excerpt from the report.

> The TIAA portfolio has generally reported higher yields than the other insurance companies, the result of aggressive financial management aided by the predictable character of in-payments and out-payments inherent in most private pension plans and in the TIAA annuity contracts with no cash or loan values. . . . TIAA investment results have led to yields that support a current interest rate of 7½ percent on accumulations attributable to premiums paid since March 1, 1969 and 5¾ percent on premiums paid before that date. (During the payout period current interest is 7½ percent.)
>
> CREF's assets are wholly invested in common stocks and thus its investment performance can be directly compared with that of general unmanaged portfolios represented by market averages, and with open-end mutual funds. In the case of TIAA, risk considerations did not explicitly enter the evaluation of performance; however, it is important that rates of return be interpreted in terms of the level of risk when discussing the CREF portfolio. . . . It can be seen that CREF is a slightly higher risk portfolio than the hypothetical S & P 500 [Standard and Poor's 500 Stock Average], without an accompanying higher return. The Subcommittee's conclusion is that CREF has performed at about the same level as the market because the observed differences in return . . . though noticeable, are not statistically significant.
>
> It also should be remarked that any actual fund such as CREF bears the costs of commissions on sales and purchases, which the hypothetical S & P 500 does not. In comparison with actual open-end mutual funds generally CREF has performed favorably, being at about the middle of a representative list of funds with assets of more than $500,000,000. . . .

The report did make some specific criticisms of TIAA-CREF, most aimed at what the subcommittee called rigidi-

* An explanation of how annuity unit values are set is provided in a pamphlet "CREF Units at Work" available from CREF, 730 Third Avenue, New York, N.Y. 10017.

ties in the system. The subcommittee said it had found discontent among participants over "paternalistic restrictions" in a program which for many is not voluntary and which offers no loan features or lump-sum payment. The report applauds TIAA-CREF action providing an option of receiving a "retirement transition benefit" of up to 10 percent of a participant's accumulation at time of retirement.

On the issue of paternalism, TIAA-CREF officials and trustees appear willing to make adjustments but not to give participants major discretionary latitude with funds. The rationale seems to be rooted in a long-standing view that TIAA-CREF was created to meet the responsibility of higher education institutions to provide for the retirement of their faculty and employees and that the institutions would not be willing to contribute to the extent they do if it were not certain the funds would be used for that purpose.

The AAUP subcommittee also pressed for stronger policyholder influence on the TIAA and CREF governing boards. Whether in direct response to these suggestions or not, some "democratization" is under way, although not to the degree urged by the AAUP group. There have been four trustees directly elected by policyholders on each of the 20-member boards. In the future, another 4 members of each board are to be named from among those who have served as policyholder-elected representatives. An argument used against open election of trustees is the need for members with financial expertise.

One policy issue which will apparently be settled in the courts is the matter of differentials in annual retirement benefits for men and women. Because women live longer on the average than men, men collect higher monthly retirement benefits than women having the same employment and payin records. Women, on the other hand, collect larger lifetime benefits, on the average. The current TIAA-CREF policy is based on an actuarial "mortality differential" followed in most pension plans. Federal regulations are now in conflict over whether monthly benefits should be equal for both sexes, and the issue is before the courts.

Conventional industry ratings of TIAA-CREF seem to have been generally favorable. A 1974 analysis of TIAA by the A. M. Best Company which bills itself as "Analysts of the Insurance Industry since 1899," says "The Association has most substantial backing and, with due regard to the interests of the policyholders, has long been most ably managed." The study recommends the company to policyholders.

Not all evaluations are so complimentary. CREF made "The Bottom Line," the financial column of *New York* magazine for 14 October. Under a head "A Cruel, Costly Lesson," the column notes that the CREF portfolio has shown a paper loss of $800 million in the last 9 months and goes on to question the CREF investment strategy, although at the same time noting that Greenough "is virtually locked into the very investment strategy that's playing havoc with C.R.E.F.'s assets." As a parting shot, using the sort of detail dear to *New York*, the column quotes two partners in different brokerage houses who "griped about the lavish lunches and dinners that, they said, some C.R.E.F. personnel practically insist upon to do business with the fund."

For what it's worth, the corporate life-style at TIAA-CREF is likely to strike the visitor as neither austere nor opulent. Judging from such things as office decor and the fare in the executive dining room, the comfort level is about that of a private foundation, perhaps a shade more Spartan. TIAA-CREF, with 1300 employees, occupies an office building at 730 Third Avenue —middle-aged by Manhattan standards —which it now owns. As with other New York–based operations, a move out of town has been considered but in this case rejected.

TIAA-CREF trustees with university backgrounds say their impression is that executive salaries and perquisites seem to be in line for an organization which ranks among the top ten insurance companies in the country. It is true, at the same time, that neither the AAUP subcommittee or other outsiders have looked critically at the TIAA-CREF salary structure, or at employment and promotion practices.

The ultimate criterion, however, should be the experience of TIAA-CREF retirees. Because of the multiplicity of institutional arrangements and career patterns it is difficult to construct a profile of the typical TIAA-CREF annuitant among the roughly 50,000 now drawing benefits. A general idea can be gained, however, from a recently completed study of TIAA-CREF annuitants published under the title *My Purpose Holds*. The study was based on 1502 responses to questionnaires from 2269 annuitants over age 60 in a random sample. They were asked not only for financial information but for other comments on retirement experience.

Of those who replied, 55 percent reported they lived "well" or "very well" and another 36 percent said they lived "adequately." About 25 percent indicated that their standard of living was lower than before retirement.

It is important to note that, overall, the retirees reported that two-thirds of their income came from their annuities and Social Security while a quarter was derived from investments and 10 percent from post-retirement employment. And the comments on the questionnaires stressed that investments outside the pension plan were particularly important in retirement finances.

Only about 4 percent of the annuitants reported incomes of less than $250 a month and another 18 percent under $500. A third had incomes of between $500 and $1000 a month and another third between $1000 and $2000, while 10 percent were in the over-$2000-a-month bracket.

Every TIAA-CREF participant gets the annual blue and yellow forms which carry a record of his accumulations and projected retirement income (although without any inflation factor figured in) so that he can estimate where he stands.

A major virtue of TIAA-CREF from which the policyholder profits is that it is a nonprofit organization with no shareholders in the ordinary sense. Operating costs also are relatively low, partly because there are no agents or national network. TIAA-CREF, however, depends exclusively on the premiums paid by individuals and institutions and on the vicissitudes of the investment market. In a period like the present one, TIAA-CREF annuitants cannot look to their pension plan for cost-of-living increases. Retirees under the federal Civil Service system have annuities tied to the consumer price index, and many corporations have pension plans that are responsive to inflation. But TIAA-CREF retirees cannot call on the U.S. Treasury or corporate coffers; colleges and universities are in no shape these days to offer ex post facto help to retirees.

All of this emphasizes the central fact that TIAA-CREF policyholders should hope fervently that investment professionals are right in their Newtonian faith about the market that what goes down must come up.

—John Walsh