

Edward O. Thorp is the author of the best-seller *Beat the Dealer: A Winning Strategy for the Game of Twenty-One* (Random House 1962, 1966). It presented the first scientific system ever devised for a major casino gambling game and revolutionized the game of blackjack. His book *Beat the Market* (Random House 1967, coauthored with S.T. Kasouf) helped launch the derivatives revolution that transformed world securities markets. His hedge funds and his personal portfolio has been profitable in each of the subsequent 42 years. Based on his work, he and Jay Regan launched the first market neutral hedge fund in 1969. Dr. Thorp, with Claude Shannon, also invented the first wearable computer in 1961 to win at roulette. He has also written *Elementary Probability* (1966), *The Mathematics of Gambling* (1984) and numerous mathematical papers on probability, game theory, and functional analysis.

He completed undergraduate and graduate work at U.C.L.A., receiving the B.A. and M.A. in physics, and the Ph.D. in mathematics in 1958. He has taught at U.C.L.A., M.I.T., New Mexico State University and was Professor of Mathematics and Finance at the University of California at Irvine.

How to Maximize Your Trust Assets

Overview: Cryonicists have the problem of protecting and compounding future assets over a very long time, perhaps centuries. The problem and the solution are essentially the same as that of creating a perpetual endowment. I addressed this in my columns for the quantitative financial magazine *Wilmott*, from which this is drawn. You can read the original articles and others on my (under construction) website www.edwardothorp.com.

The figures in the Table for a 1.9% payout rate for a tax exempt entity with negligible administrative costs apply to a taxable entity that has a 1.9% cost per year for taxes plus administration – say 1% for administration and 0.9% for taxes. If these costs are less, results will be better and if these costs are more, results will be less. If future real returns on investment are better than the past results will be better and, if they are less good, results will also be less good.

A Million Dollars For Mathematics -- And An Exercise in Finance

by Edward O. Thorp
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"Compound interest," said one of the Barons Rothschild, "is the eighth wonder of the world."

My wife Vivian and I are offering the University of California, where I taught for many years, one million dollars to endow a chair in mathematics at the Irvine campus. Our objectives are (1) to support the research of an individual mathematician of exceptional talent, and (2) using a modified investment and distribution policy, to better achieve this by causing the principal, through the power of compound growth, to eventually increase so that the chair becomes one of the most richly endowed in the world, thereby attracting extraordinary mathematical talent to UCI and UC.

Investment Policy: Asset Allocation

We believe that there are just two basic investment decisions for the non-taxable (hence, in the U.S. unleveraged¹) investor: (1) the allocation of assets to major categories such as stocks, bonds, real estate and commodities, and to their numerous subcategories, and (2) whether to choose active investing (attempting to pick outperforming securities within an asset class) or to choose passive investing ("buying the market," via indexing). We'll address each of these in turn.

Since this endowment is a perpetuity, we're interested in the long term rate of return on asset classes. In his famous book *Stocks for the Long Run*, Jeremy Siegel gives the compound rate of return of major U.S. financial asset classes for 1802-1997, a period of 196 years! The real, i.e. inflation adjusted, rates of return were²: stock market 7.0%, long term governments 3.5%, short term governments .9%, gold -0.1%, cash -1.3% (i.e. consumer price inflation was 1.3%). This is corroborated in the monumental study *Triumph of the Optimists*, where Dimson et al cite real annualized rates of return for the U.S. for 1900-2000 as:³ equities 6.7%, bonds 1.6% and bills 0.9%. They also show a similar pattern held true worldwide, over the sixteen countries they studied.

The first major study of this type, a famous paper by Ibbotson and Sinquefeld which appeared in 1976, is now annually updated as the *Stock, Bonds, Bills and Inflation Yearbook*. For the period from December 31, 1925 through December 31, 1998, the 1999 yearbook gives⁴ for the U.S.: Large company stocks 7.9%, small company stocks 9.1%, long term corporate bonds 2.6%, long term government bonds 2.2%, intermediate term government bonds 2.2%, U.S. Treasury bills 0.7%, and cash -3.1%.

Over long periods of 30 years or so, stocks have regularly and substantially outperformed bonds, bills and gold. This "equity premium" represents a price long term investors have been paid to take on risk. Short horizon investors have paid it by virtue of their collective demand for safety. So we have both empirical and theoretical reasons to expect an equity premium to exist in the future. Estimating the magnitude of the future equity premium is currently the subject of extensive discussion among economic and financial theorists and practitioners. But, motivated by what we believe is the strong likelihood of some continuing long run advantage⁵ to equities, we have resolved the asset allocation issue by specifying that the endowment funds be held in equities to the extent practical, i.e. nearly entirely except for necessary, convenient and generally small cash balances.

Though stocks won't necessarily outperform the other asset classes over the hopefully very long existence of the chair, in the race for the greatest compound rate of growth we agree with Damon Runyon's advice: "The race is not always to the swift, nor the battle to the strong, but that's the way to bet!"

Investment Policy: Active Management Versus Passive Management

The next issue is how to choose the equities in which to invest. The basic decision is whether to be a "passive" investor, which is defined as "buying the market," or to be an "active" investor, which means picking stocks, either directly or through intermediaries ("money managers"), in an effort to "beat the market."

To explain the tradeoffs between passive and active investing, we begin with a simplified and idealized illustration. Suppose "the market," or universe of potential stock investments, consists of all U.S. listed stocks. Then an investor in stocks is "passive," and holds the market portfolio, if he has the same fixed

percentage of each of the roughly 10,000 listed stocks⁶ on U.S. exchanges. For instance, with Berkshire Hathaway's (BRK.A, BRK.B) recent market capitalization of \$114 bn, and a (hypothetical) total market capitalization of \$11.4 trillion, 1% of the value of stock portfolio of each passive investor would be in Berkshire Hathaway stock. The passive investor holds securities in the same proportions as do all investors collectively. A passive investor who invested \$11.4 million in a market worth \$11.4 trillion would own one one-millionth of the stock of each listed company. Putting aside the practical issues of actually doing this for now, we move on to the "active" investor.

An active investor is defined as any investor other than a passive investor. So his allocations vary from the collective allocation. This can be inadvertent (inheritance, significant ownership of a business, grants of shares of stock by employers, etc.) or an attempt to choose a portfolio that will have a performance superior to that of the market. Examples of ways to do this include hiring financial advisors, either directly or indirectly through mutual funds or hedge funds, and trading one's own account using "information."

We now come to a key insight. Note that since each passive investor owns a fraction f_i of the market portfolio, then all the ($i = 1, 2, \dots, n$) passive investors as a group must own a fraction $f = f_1 + \dots + f_n$ of the entire market portfolio. The leftover portion, which must be the fraction $1 - f$ of the entire market portfolio, is what is owned by all the active investors collectively.

Thus the active investors as a group own the market portfolio even though no one of them does individually. If we continue our idealized example by assuming (for the moment) that there are no transactions costs, then it follows that:

- 1) Each individual passive investor, and passive investors as a group, get the market return.
- 2) Active investors collectively, but not necessarily individually, get the return on the market portfolio.
- 3) The returns to active investors, to the extent they deviate from the market return, are (before costs) dispersed both above and below the market return with an average (capitalization weighted) dispersion of zero.

(Continued in the next issue.)

¹ We're aware of the current exemption which allows tax exempt U.S. entities to invest in possibly leveraged offshore hedge funds.

² Segel, Tables 1-1 and 1-2.

³ Dimson, et al, Figure 4.2.

⁴ Ibbotson Associates, Tables 6-7 and 6-8, pp. 122-3.

⁵ Another way to see why we might expect an equity premium in the long run is to suppose that the long run return from stocks was expected to be equal to or less than that for bonds, and that bonds were expected to be less risky than stocks. Assuming that investors are on average risk averse, we would then expect investors to sell stocks and buy bonds, after which the future expected returns from the now cheaper stocks would be greater than before and the future expected returns from the now higher priced bonds would be less than before.

⁶ Siegel, page 61, fn 5. As noted there, this figure excludes some 20,000 or so seldom traded "penny stocks."

References

1. Dimson, Elroy; Marsh, Paul; Stanton, Mike, *Triumph of the Optimists: 101 Years of Global Investment Returns*. Princeton University Press, Princeton, New Jersey and Oxford, 2002
2. Ibbotson, Roger G. and Sinquefeld, Rex A., "Stocks, Bonds, Bills and Inflation: Year-By-Year Historical Returns (1926-1974)," *Journal of Business* 1976, vol. 49 (3), 313-338.
3. Ibbotson Associates, *Stocks, Bonds, Bills and Inflation, 1999 Yearbook. Market Results for 1926-1998*. Ibbotson Associates, Chicago 1999.
4. Siegel, Jeremy J., *Stocks for the Long Run*, Second Edition, Revised and Expanded. McGraw Hill, New York, 1998

A Million Dollars For Mathematics -- And An Exercise in Finance Part II

by Edward O. Thorp
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"Compound interest, even when explained, seems like a trick." – Bill Gates

When I invited Bill Sharpe to lecture at the University of California at Irvine in 1975, he pointed out to me the arithmetic of active investing: that

active investors collectively achieve the market return before costs and so after costs each cost efficient passive investor will outperform the average active investor by 2% or so. Bill Sharpe and I met earlier when he taught at UCI for a couple of years in the late '60s. Unfortunately for UCI, it let Stanford capture him. Had they retained him, the campus likely would have scored its first faculty Nobel Prize in 1990, in addition to the two received later, in 1995 (Chemistry and Physics).

The Real World: Index Funds, Tracking Error, and Costs

It is not practical or even possible for a single investor to exactly replicate the market portfolio. To do so would generally require holding fractional shares, trading in odd lots, and numerous tiny transactions to reinvest dividends, acquire stock in newly listed companies ("births") and liquidate holdings in newly delisted companies ("deaths"). However it is now both possible and practical to approximate the market portfolio and returns. Investors can do this, for instance, by purchasing shares in "Index" Funds, which are designed to approximately replicate a capitalization weighted portfolio which includes "most" of the market value of some benchmark, which we have so far taken to be all U.S. listed securities. Siegel¹ gives the following breakdown for some widely used indexes as of June 30, 1997. (The Russell 2000 does not overlap the Russell 1000. The Russell 5000 was then actually 7335 companies.):

Index	Percent of Market
S&P 500	76.1%
Russell 1000	86.4%
Russell 2000	11.0%
Russell 1000 + 2000	97.4%
Russell 5000	100.0%

We can see from the table that, using an Index mutual fund that approximates a broad market index such as one of those in the table, we can closely approximate passive investing. Due to the widening awareness of the benefits of passive investing and of indexing, a broad range of index funds and other securities which approximate the market, such as ETFs (Exchange Traded Funds), are now available.

For a tax exempt entity that indexes, the two principal considerations are "tracking error" and costs. Tracking error refers to the difference in returns between the chosen Index fund and the market. In a capitalization weighted index fund, the principal source of tracking error is generally due to the fact that the fund does not hold all listed stocks. Usually,² the greater the percentage of the market which is omitted, the greater the tracking error. The best known

example is the S & P 500 Index. It includes nearly all of the large cap stocks (BRK is **not** included, due in part to its remarkably high price per share, about \$73,000 as of this writing) and many, perhaps most, mid cap stocks. However it omits most small cap stocks. Hence the S & P 500 acts like a portfolio of large and midcap stocks and the part of the market which the S & P 500 omits acts largely like a portfolio of small companies. When smaller companies outperform larger companies, the S & P 500 Index is likely to lag the market. When smaller companies underperform larger companies, the S & P 500 Index tends to outperform the market. Additional but usually very minor Index fund tracking errors arise because the relative weights of the stocks in the portfolio differ slightly from the actual relative market capitalizations, and also because the funds typically have a small percentage of their assets in cash as a result of purchases and sales by investors.

Passive investors wish to minimize their costs. These costs, which all investors bear, include the costs of administration and management, and also the costs of buying and selling stocks in the marketplace. The "no load" U.S. index mutual funds with the lowest costs typically have all inclusive annual charges of 0.18% to 0.3%. In contrast, "load" mutual funds typically have annual charges of 1.5% or so. These reflect the much higher fees to sell, administer and manage "active" funds. Warning: Many investors make the mistake of purchasing shares in one of the many index funds with excessive fees, as measured by the ratio of "expenses" to assets. The Vanguard Group sets the standard at 0.18% on its S & P 500 Index Fund. In contrast a Morningstar study as reported in the *New York Times*,³ found 57 index funds that charged more – averaging 0.77%, topped by a Morgan Stanley index fund charging 1.5%. "Our fees reflect the value of providing advice through highly trained financial advisers," said one apologist. "An index fund can be run by an orangutan," replied a critic.

Index funds have a relatively low annual rate of portfolio turnover. I believe the annual turnover for the Vanguard S & P 500 Index fund has been averaging about 6% a year. Part of this low turnover comes from a (fluctuating) net imbalance of purchases and sales by investors, leading to corresponding purchases or sales of securities by the fund. Also purchases or sales of securities are needed to adjust when stocks are added to or deleted from the index. The next reduction in performance due to transactions costs and to "cash balance drag" average 0.2% or less, according to academic studies. Thus, mathematically, we can represent the expected return on a no load index fund as (1)

$$R(I_i) = R(M) + e(I_i) - c(I_i)$$

where $R(I_i)$ is the return on the index, $R(M)$ is the return on the market, $e(I_i)$ is the expected tracking error, and $c(I_i)$ is the expected cost of administration, management and trading.

As Paul Marx of the UCI Foundation points out, it's important to note that the definition of passive investor only has meaning when we stipulate the reference "universe" of securities from which the investments are chosen. Thus

an investor who buys a fixed percentage of every listed U.S. stock is passive in this reference universe, whereas he is not passive if his reference universe consists, say, of several classes of assets such as stocks, bonds and bills. With reference to this larger universe the asset allocator who, for example, holds relative proportions of stocks, bonds and bills different from the relative proportions of the market capitalizations of these asset classes, is not "passive" i.e. is "active," even if he is "passive" within each asset class separately.

The Penalty for Active Investing

Collectively, active investors as a group have an expected return given by

$$(2) \quad R(A) = R(M) - C(A)$$

where $R(M)$ is the return on the market and $C(A)$ is a comparatively large cost of 2% or so. This reflects paying average fees of 1% or more to professional managers and advisors. The *New York Times*⁴ reports that John Bogle, who founded Vanguard, stated in testimony to congress last March that the expense ratio (fees paid divided by assets) of the average mutual fund was 1.36%. This is only one part of the average cost of active management, $C(A)$ in equation (2). It is increased further by average annualized trading costs of 1% or so, for a grand total of roughly 2.4%. Each individual active investor has an expected return of

$$(3) \quad R(A_i) = R(M) + E(A_i) - C(A_i) \text{ where,}$$

typically, the tracking error $E(A_i)$ is "large." For comparison with equation (2), the $E(A_i)$ average to 0, the $C(A_i)$ average to $C(A)$, and the $R(A_i)$ average to $R(A)$, with all averages capitalization weighted. Thus there is a "spread" in results about the group averages, amongst the various active investors. It's clear from equation (3) that the most cost efficient active investment policy is "buy and hold," as this makes $C(A_i)$ close to zero.

The Long Term Investment Policy

For the long term we are led to specify that the endowment assets eventually be allocated entirely to a no load common stock index fund with a low expense ratio, initially the Vanguard S & P 500, except for relatively small cash balances of convenience. In the table below we compare hypothetical future results of this policy with others. Our asset choices are stocks and long term government bonds. We omit an investment in short term government bonds because the historical 2.9% rate of return is worse than the alternatives. For the illustration we assume inflation adjusted (i.e. real) future rates of return over the

next 150 years will be similar to those of the past 200 years: stocks (S) 7.0% and long term bonds (LB) 3.5%. The 4.5% payout scenarios assume that, instead of an administrative endowment of 5%, a 5% charge for administration is deducted from the endowment when the chair is initially funded.

Table. Growth of Endowment, Various Policies

Policy	Real Annual Growth Rate	Future Real Value/Payout (\$)						years to double
		1 year	35 years	100 years	150 years	years to halve		
Stocks: Payout 1.9% Costs Payout 4.5 %	7.0%							
	4.6% 3.1%	1.046m 1.031m	19K 19K	4.82m 2.91m	92K 55K	89.8m 21.2m	1.71m 0.40m	15 23
Passive 0.5% Active 2.0% on (0.95)	2.0% 0.5%	1.020m 1.005m	45K 45K	1.90m 1.19m	85K 51K	6.9m 1.6m	0.31m 70K	35 139
Passive 0.5% Active 2.0%	3.5%							
Bonds (Long Term): Payout 1.9%	3.5%							
Costs Payout 4.5%	1.1% 0.1%	1.011m 1.001m	19K 19K	1.47m 1.04m	28K 20K	3.0m 1.1m	57K 21K	63 693
Passive 0.5% Active 1.5% (on 0.95)	-1.5% -2.5%	.985m .975m	45K 45K	0.56m 0.39m	25K 18K	.21m .08m	9K 4K	46 27
Passive 0.5% Active 1.5%								

The Table shows the dramatic impact of three variables: asset allocation, passive versus active investment, and payout rate. Within 35 years, the endowment for every policy paying out 1.9% grows enough faster so that the payout to the chair will be forever greater than that with a policy paying 4.5% and having the identical investment results. The Table also shows the power of superior asset allocation. Choosing stocks instead of bonds is better in the long run except for the single case of the worst stock policy, active investing with a high (4.5%) payout rate. Even so, this is surpassed only after more than a century and only by the best bond policy, which is low cost passive investing with a low (1.9%) payout rate.

The impact of costs is also evident. The 1.5% assumed cost differential in favor of passive stock investing leads in each case in 100 years to an endowment which is more than four times as large as the otherwise identical active alternative. This disparity more than doubles again during every additional fifty years. It can be shown that this is true no matter what the assumed rates of return is on the underlying portfolio before costs.

Our figure of 2% for the average annual cost of active management is intended to be an underestimate so as not to bias the results in favor of our chosen policy of passive investing. As *Fortune Magazine*⁵ quotes Gary Gensler, former undersecretary of the U.S. Treasury, "Right now the average expense ratio for a mutual fund is about 1.3% but when you add up trading costs and all the other fees, you can get up to 3% in annual costs." According to *Fortune*, the average U.S. equity fund has lagged the S&P 500 stock index by this same 3% annualized, since 1982. "Translation: \$10,000 invested in the average equity fund 20 years ago is now worth \$56,765 vs. \$105,250 if it had been invested in the stock market." Similarly the assumed 1% cost differential for bonds in favor of passive investing leads to the passive endowment being twice as large in 70 years, four times as large in another 70 years, etc. Although off to a modest start, after 35 years, our choice of stocks, passive investing, and a payout rate of 1.9%, has increased the endowment so much that despite the lower payout rate, the chair holder now receives more than in any of the other scenarios. After 100 years, some of the alternatives have shrunk to a pittance. Meanwhile our choice has grown to about \$90 million with an annual payout of \$1.7 million, far more than the runners-up. Then as the years continue to roll by, the gap widens ever more rapidly.

¹ Figure 4-2, page 62.

² A mathematician can easily construct examples which, although somewhat unusual, violate this. It's also easily violated in the extreme cases of "Indexes" (i.e. portfolios

which are cap weighted in the stocks they hold, but don't hold all stocks) which only hold a small percentage of the market.

³ *New York Times*, July 27, 2003. Money and Business: Section 3, page 1.

⁴ *New York Times*, August 3, 2003. Money and Business: Section 3, page 1.

⁵ *Fortune*, September 1, 2003.

**A Million Dollars For Mathematics
-- And An Exercise in Finance Part III**

by Edward O. Thorp
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"They asked me where I found all the millionaires who invested in my partnership." (Laughing) "I told them I grew my own." – Warren Buffett to the author, 1968.

Our Table in the previous issue of *Wilmott* suggests that if the United States continues to prosper, if the University continues to exist, and our investment and distribution policies continue to be implemented, the power of compounding may well lead to an endowment fund for our chair in mathematics which, valued in today's dollars, far exceeds that of the current endowment for any chair that now exists in the world. As for the future existence of the University, Sample and Bermis¹ say that former University of California Chancellor "Clark Kerr observed that, since 1520, only about 85 institutions have remained continuously in existence. ... about 70... [of these]...are universities. ...few things last longer or are more resilient than universities." As for our investment and distribution policies, we hope the explanations we have given here will help insure their continued use.

For those who wonder how likely this is to come to pass, we remind them of a similar plan by Benjamin Franklin to, in the words of biographer H.W. Brands, make a bequest which "would be immediately useful, yet it would gain in philanthropic power with passing years."

Upon his death in 1790, Franklin set aside two special revolving funds of 1,000 pounds each. One went to Boston, and the other to Philadelphia. They were to be lent in small portions at 5% per annum to help "young married artificers." Franklin expected each fund compounding at 5% per annum to increase in a century to over 130,000 pounds, at which point 100,000 pounds was to be used for public works. In the second hundred years the remainder would, at 5%, increase to more than 4 million pounds, which then was to be

divided between the cities and their states. In the event, by 1990 the Boston fund had grown to \$4.5 million and the Philadelphia fund to \$2 million. We expect the endowment to be invested in a no load index fund for the long run.

Risk for the Endowment Fund

Computer simulations and theoretical analysis suggest that the principal financial danger to the fund is the possibility of bad investment results sometime in the first few decades. As the extreme historical instance in the U.S., Ibbotson Associates give the inflation-adjusted total return for large company stocks for the period August 31, 1929 through May 31, 1932 as -79.0%. A million dollar endowment so invested in an index at the close on August 31, 1929 would – without spending – have been reduced to an inflation-adjusted \$210,000. Paying out 2% annualized, prorated over the 2¾ years, would have further reduced it to about \$199,000.

Selection Criterion: Mathematical Potential

Political fads and fashions come and go. Special interest groups attempt to advance their agendas by seeking preferences or handicaps for particular subgroups. The history of mathematics through the ages shows contributions from an enormous diversity of cultures, beliefs and social systems. We specify that there is to be neither preference given nor discrimination against any candidate on the basis of his or her race, religion, national origin, gender, or beliefs, and that mathematical merit and future potential, as well as the will and ability to implement them, be the criteria for selection.

I thank Prof. Ronald Stern, Dean of Physical Sciences at UCI, for encouraging and facilitating the creation of the chair, Paul Marx of the University Foundation for legal help and for many insightful conversations, and my wife Vivian for her part in creating the conditions that made our contribution possible.

We hope we have planned well and that our gift, like Ben Franklin's, will accrue to the benefit of many generations.

¹ Sample, Steven B. and Bermis, Warren, *Los Angeles Times* Book Review, July 13, 2003, page R9.

References

1. Brands, H.W., *The First American. The Life and Times of Benjamin Franklin*. Anchor Books. Random House, New York, 2000.
2. Berkshire Hathaway Inc. Annual Report, 2002.

INSTRUMENT OF TRUST

THIS INSTRUMENT OF TRUST is made the 2 day of November, 1995, between ABC ("Settlor") and XYZ ("Trustee").

The Trust created by this instrument shall be known as the "ABC PRESERVATION TRUST" or by such other name as the Trustee may from time to time in its discretion declare to be the name of this Trust (hereinafter, sometimes referred to as "this Trust" or "the Trust").

The purpose of this Trust pertains to the cryonic suspension and possible resuscitation of the Settlor's human remains. The Trustee understands and accepts the fact that the preservation of human remains by cryonic suspension is new, experimental, unperfected, and not consistent with contemporary medical or mortuary practices. The Trustee shall have no liability to any person for any good faith exercise of the Trustee's powers consistent with the purpose of this Trust.

ARTICLE ONE

TRUST ESTATE; IRREVOCABILITY

1.1 Initial Trust Estate. The Settlor has transferred and delivered to the Trustee without consideration cash in the amount of \$30,000.00. Said cash together with any other cash or property which may hereafter be transferred and delivered to the Trustee, and all income therefrom, accretions thereto, substitutions therefor and reinvestments thereof, is referred to herein as the

"Trust Estate" and shall be held, administered and distributed in accordance with this instrument.

1.2 Additional Property. The Settlor, or any other person, may from time to time, with the consent of the Trustee, add additional cash or other property to the Trust Estate by deed, assignment, bequest or devise; and if so added, such cash or property shall thereupon be subject in all respects to the terms and provisions hereof.

1.3 Irrevocability. This Trust is irrevocable and may not be amended or modified in any way; and it may not be terminated except through distributions permitted by this instrument.

ARTICLE TWO

DISTRIBUTION OF INCOME AND PRINCIPAL

2.1 Prior to Successful Resuscitation.

2.1.1 Prior to the date of the Settlor's legal death, the Trustee may use and apply so much of the income and principal of the Trust Estate, and may exercise any options available to the Trustee under the provisions of any life insurance policy owned by the Trust (including the option to use policy dividends, to borrow against any policy, and/or to make withdrawals from any policy), as is necessary to pay any premiums due on any life insurance policies comprising a part of the Trust Estate. Any income not so used shall be accumulated and added to the principal of the Trust.

2.1.2 Following the date of the Settlor's legal death, until the date upon which the Settlor's human remains

are successfully resuscitated such that he enjoys the rights and protections as a person under the laws of the United States or of the state or country where he is then located, the Trustee shall accumulate all of the net income of this Trust and add it to Trust principal.

2.2 Following Successful Resuscitation. Following the successful resuscitation of the human remains of the Settlor such that he enjoys the rights and protections as a person under the laws of the United States or of the state or country where he is then located, and until such time as, in the reasonable discretion of the Trustee, he is legally capable of handling his own financial affairs, the Trustee shall distribute to or for the benefit of the Settlor so much of the net income and principal of this Trust as the Trustee in the Trustee's discretion determines may be required for his health, maintenance, welfare, happiness, benefit, comfort or support. The Trustee shall accumulate any net income not so distributed and add it to the principal of this Trust.

2.3 Termination of Trust. This Trust shall terminate at such time as the Settlor's human remains have been successfully resuscitated such that he enjoys the rights and protections as a person under the laws of the United States or of the state or country where he is then located and, in the reasonable discretion of the Trustee, the Settlor is legally capable of handling his own financial affairs (hereinafter referred to as the "Termination Date").

2.4 Distribution Upon Termination Date. On the Termination Date, the principal of the Trust Estate together with any

accumulated net income shall revert and be distributed to the Settlor.

2.5 Distribution of Trust Estate Prior to Termination Date.

If the Trust Estate must be distributed prior to the Termination Date because cryonic suspension of the Settlor's human remains is or becomes impossible or impractical, or because a resuscitation attempt fails, the Trust Estate shall be distributed in equal shares to any preservation trusts which may then exist for the benefit of the children of the Settlor, to be added to and augment the trust estates thereof. If there are no such preservation trusts then existing, the Trust Estate shall be distributed in equal shares to the Settlor's then living children, and if there are none then living, to the ABC Foundation, Inc., a Delaware not-for-profit corporation, or its successor by merger or transfer of assets.

ARTICLE THREE

POLICY PROVISIONS

3.1 Acquisition of Policies. The Trustee shall have the power to acquire by gift, bequest, purchase or otherwise, as a part of the Trust Estate, one or more insurance policies insuring the life of the Settlor, which policies shall be owned by and payable to the Trustee.

3.2 Ownership Vested in Trustee. The ownership of any and all policies of insurance applied for and purchased by the Trustee hereof or transferred and assigned to the Trustee hereof shall be irrevocably vested in the Trustee.

3.3 Execution of Instruments. In connection with the transfer of any such policies to the Trustee hereunder, the Settlor agrees to execute, in addition to an appropriate assignment of ownership form, any and all other instruments necessary or appropriate to permit the Trustee to exercise all rights, powers, options, privileges or incidents of ownership which the Settlor may have had as the owner of such policies.

3.4 No Retained Rights in Policies. The Settlor shall have no right, title, interest or incident of ownership whatsoever in or to any such policies purchased by or transferred to the Trustee hereunder, nor shall the Settlor exercise any right, power, option, election, privilege or incident of ownership under any such policies.

3.5 Exercise of Owner's Rights. In addition to the general powers conferred upon the Trustee hereunder, the Trustee shall also have, with respect to each insurance policy now or hereafter held under the provisions of this Trust, the additional powers to: (i) exercise any right, power or discretion with respect to the acquisition, retention, disposition or maintenance in force of any policy held in this Trust, and any incident of ownership with respect to any such policy, including but not limited to the powers stated in the following subsections of this paragraph; (ii) divide or otherwise sever any such policy into two or more policies insuring the Settlor; (iii) receive dividends or distributive shares of surplus thereon in cash, or apply the same to the payment of premiums thereon or to the purchase of additional insurance, including term or paid-up insurance, or permit the same to remain

on deposit at interest with the respective insurers, and to receive such interest or permit it to accumulate; (iv) receive from the insurer or from any bank or other lender such advances or loans which may be available on account of or from any such policy or on the security of any such policy; (v) receive the cash surrender values of any such policy, by loan, withdrawal or otherwise, the proceeds of matured endowments, or other lifetime policy benefits; (vi) exercise any and all options, elections, rights and privileges granted in any such policy; (vii) sell, assign (absolutely or as collateral), transfer, pledge or hypothecate any such policy; (viii) convert any such policy into an extended term coverage contract, supplementary contract, fully or reduced paid-up contract, or into any other form of insurance or annuity; (ix) with respect to the payment of premiums on any such policy held in this Trust, pay premiums as they become due from any property held in this Trust, or prepay, for reasonable periods, as the Trustee may deem advisable, any premiums which may be due, or may reasonably be expected to become due, thereon; and (x) exercise any and all such other rights that the owner of a life insurance policy has with respect to such policy.

3.6 Trustee Not Required to Pay Premiums. The Trustee shall not be obligated to pay the premiums due on policies of insurance held hereunder nor to see that such policies are kept in force. If the Trustee determines that the principal of the Trust Estate is insufficient to pay any premiums or other charges on policies of insurance held hereunder, the Trustee shall immediately notify the

Settlor, in writing, of that insufficiency, and shall afford the Settlor the opportunity to pay it.

3.7 Limitation on Trustee's Duties with Respect to Life Insurance.

3.7.1 The Trustee, conclusively and without inquiry or independent investigation, may rely upon the representations of any person selling or in any way associated with the marketing, promotion or sale of a given life insurance policy regarding the relative quality of such policy (as compared to other available policies) or regarding the absolute quality of such policy (without regard to other available policies). Specifically, but not by way of limitation, the Trustee at no time shall have any duty whatsoever (i) to verify that any particular life insurance policy satisfies the requirements of a life insurance contract under Section 7702 of the Internal Revenue Code; (ii) to compare the performance or pricing, or the projected performance or pricing, of a particular life insurance policy with the performance or pricing, or projected performance or pricing, of any other life insurance policy which may then be available from any source; (iii) to assess the appropriateness of purchasing or retaining any life insurance policy as an asset to the Trust as compared to other then-available vehicles that are not life insurance policies; or (iv) to investigate the strength or solvency of the company which issued or is offering a given life insurance company policy.

3.7.2 The Trustee may retain any life insurance policy purchased by the Trustee or transferred to the Trustee by the Settlor, a predecessor Trustee, or any other person, and the Trustee shall have no duty at any time to make any inquiry or investigation into the advisability of such retention (including, but not limited to, inquiry or investigation into the same or similar matters set forth in paragraph 3.7.1 above). With respect to any such policies retained by the Trustee, the Trustee shall have no liability to the Settlor or to any present or future beneficiary of the Trust for non-productivity, decline in value or lack of diversification of the Trust Estate. The fact that the Trustee may have made inquiry regarding any such matter prior to the acquisition of a policy or after the acquisition of such policy shall place no duty upon the Trustee to make any further inquiry, but shall be considered activity beyond the scope of the Trustee's duties.

3.7.3 The Trustee shall not be liable to the Settlor nor to any present or future beneficiary of the Trust for any loss or damage suffered in connection with performance or lack of performance of any life insurance policy owned by the Trust or by the insolvency of any life insurance company issuing any such policy.

3.7.4 The Trustee's duties and responsibilities with respect to any life insurance policy owned by the Trust, until such policy matures or is surrendered or otherwise disposed of, are to provide safekeeping services with respect to the

policy, to pay premiums as and when they come due if it has sufficient available funds to do so, and to provide notices to holders of withdrawal rights in accordance with such provisions hereof.

3.7.6 The Settlor specifically acknowledges that the Trustee would not accept the position of Trustee unless its duties and responsibilities were limited as set out herein.

3.8 Collection of Policy Proceeds. Upon the legal death of the Settlor, the Trustee shall furnish the necessary proofs of death to the insurance company or companies which issued any policies of insurance the proceeds of which are payable to the Trustee hereof, shall collect the proceeds of all such policies of insurance, and shall collect and receive any other property which may be made payable to the Trustee hereof and subject to the terms and conditions hereof. For such purpose, the Trustee shall have full power and authority to execute and deliver any receipt or other voucher for such proceeds or property, to institute any suit or suits at law or in equity to enforce the payment of the proceeds of any such policies or to collect any such other property, and, in case of controversy or litigation over the collection of the same, to adjust, compromise or otherwise settle any controversy or contest concerning such policies of insurance or other property, or the collection thereof.

3.9 Indemnification of Trustee. If the Trustee enters into or maintains any such litigation, the Trustee shall have the right to be reimbursed for such expenses as the Trustee may incur thereby from the proceeds of any such policies of insurance or from such

other property subject to the terms and conditions hereof; provided, however, that the Trustee shall not, except at the election of the Trustee, institute or maintain any legal action for the collection of such proceeds or property unless the Trustee is first indemnified, by such person, persons or entities satisfactory to the Trustee, against any expenses to which the Trustee may, in the judgment of the Trustee, be subjected as the result of instituting or maintaining any such action.

ARTICLE FOUR

WITHDRAWAL RIGHTS

4.1 Limited Withdrawal Right for Settlor's Children. With respect to each transfer to this Trust during the Settlor's life, including the initial transfer thereto, each of the Settlor's children who are living on the date of any such transfer shall have the absolute right and power, for a period of forty-five (45) days following receipt of notice of such transfer, to demand immediate distribution to himself or herself of a pro rata portion of the transfer; provided, however, that in no event may the amount subject to withdrawal by or on behalf of any such person exceed in any calendar year the sum of Five Thousand Dollars (\$5,000) (or Ten Thousand Dollars (\$10,000) if the Settlor's spouse elects under Section 2513 of the Internal Revenue Code to split gifts made during such calendar year for gift tax purposes). The Trustee may, in the Trustee's discretion, satisfy any such demand, in whole or in part, by distributing to such person cash or property of equivalent then fair market value, including an interest in any

life insurance policy held as part of the Trust Estate. To the extent that the withdrawal right created under this ARTICLE FOUR with respect to any such transfer has not been exercised by any person before the expiration of such forty-five (45) day period, such withdrawal right shall thereupon lapse, and such person shall forever cease to have any further withdrawal right with respect to such transfer. This withdrawal right shall be exercisable only by a written instrument executed by any person entitled to exercise such right and delivered to the Trustee.

4.2 Notice to the Settlor's Children of Limited Withdrawal Right. Promptly after the date of execution of this Trust, and promptly following any subsequent transfers to this Trust of which the Trustee has direct or indirect knowledge, the Trustee (or the Trustee's delegate, other than the Settlor) shall give a written notice to each person known by the Trustee to have a right of withdrawal under this ARTICLE FOUR. Notwithstanding the preceding sentence, the Trustee and the person(s) entitled to the notice required under this ARTICLE FOUR may agree that such notice may be in such form and at such time or times as they may mutually agree for purposes of convenience and practicability; provided, that in all events, a written notice of each direct or indirect transfer to this Trust shall be given to the person(s) entitled thereto under this ARTICLE FOUR no later than the later of forty-five (45) days from the date of such transfer or December 31 of the calendar year in which such transfer is made. The notice required hereunder shall be deemed properly delivered when mailed postage prepaid, addressed to the person having the withdrawal right at his or her

last known address, or when personally delivered to and signed for by the recipient. In no event shall the Trustee be held liable for failing to give any notice required hereunder, nor shall the failure of any person to receive any such notice be deemed to abrogate in any respect such person's absolute right to make withdrawals from this Trust in accordance with the provisions of this ARTICLE FOUR.

ARTICLE FIVE

TRUSTEE PROVISIONS

5.1 Resignation of Trustee. A Trustee may resign as Trustee hereunder at any time by delivering written notice of such resignation to the Trust Advisors (described below). If there are no Trust Advisors in existence who are entitled to and capable of appointing new trustees of this Trust, a Trustee may resign by petitioning a court of competent jurisdiction for the appointment of a successor Trustee at the expense of this Trust and not of the Trustee. Upon acceptance by the successor Trustee of this Trust and upon approval of its final account by those entitled to it, the resigning Trustee will be discharged.

5.2 Removal and Change of Trustees. Trustees may be removed or changed as follows:

5.2.1 Subject to the provisions of subparagraph 5.2.2 below, the power of appointing new or additional Trustees of this Trust shall be vested in the Trust Advisors, or if there are none in existence who are capable of exercising such power, in the Trustee or the personal representative or liquidator of the last remaining Trustee; and such power shall extend to the appointment of new Trustees in the place of any Trustee dying or resigning its trusteeship or being removed from the office of Trustee, and also to the appointment of additional Trustees up to any number, subject to such limit

(if any) as may for the time being be imposed by law, but so that any person other than the Settlor or his spouse may be appointed and if appointed may act as a new or additional Trustee of the Trust notwithstanding that such person is resident outside the jurisdiction of the governing law.

5.2.2 The Trust Advisors shall have power at any time and from time to time to remove a Trustee from office, but the removal of a Trustee shall be effective only after:

(a) receipt by such Trustee of written notice of its removal from office; and

(b) reasonable security having been provided for indemnifying such Trustee against liabilities to any person whether existing, future, contingent or otherwise for which the outgoing Trustee may be answerable as a Trustee or former Trustee (including, without limiting the generality of the foregoing, liabilities for taxes incurred by it purely by reason of its duties relating to this Trust).

5.2.3 The office of a Trustee shall be automatically terminated and vacated if such Trustee, being an individual, shall be found to be insane or of unsound mind or if he shall become subject to any proceedings under any bankruptcy or insolvency laws applicable to him; or if such Trustee, being a corporation, shall enter into liquidation or dissolution proceedings whether compulsory or voluntary (not being merely a voluntary liquidation for the purposes of merger, consolidation, amalgamation, reorganization or reincorporation).

5.2.4 If the Trust Advisors, or if there are none in existence who are capable of exercising this power, the Trustee believe or suspect that an act of emergency (as hereinafter defined) has occurred or is imminent, or believe that after taking into account the relevant perpetuities laws and any other laws the Trust Advisors or Trustee, as the case may be, deem appropriate, a change of the situs of this Trust and or any of its assets will be advantageous for the beneficiaries of this Trust, the Trust Advisors or Trustee, as the case may be, may change the situs of this Trust and/or any of its assets to any place within or without the United States by written instrument declaring that forthwith a successor Trustee shall become the Trustee in place of the person who immediately prior thereto held office as the Trustee (hereinafter in this paragraph 5.2 called "the Former Trustee"), it being nevertheless provided that nothing herein shall be construed as placing any obligation whatsoever upon the Trust Advisors or Trustee to exercise such power.

5.2.5 In the event that the Trust Advisors or Trustee, as the case may be, has made a declaration in

accordance with the provisions of subparagraph 5.2.4 above, the Trustee shall forthwith cause to be endorsed on the original of this instrument held by the Trustee a notice to that effect, and the successor Trustee shall thereupon become the Trustee and the Former Trustee shall thereupon cease to be the Trustee and the Former Trustee shall thereupon be deemed to hold the Trust Estate as the nominee of the successor Trustee.

5.2.6 Any declaration made by the Trust Advisors or the Trustee, as the case may be, in accordance with the provisions of subparagraph 5.2.4 above, and notice to that effect being endorsed on the original of this instrument held by the Trustee in accordance with the provisions of subparagraph 5.2.5 above, shall be binding and of full effect notwithstanding the fact that the grounds on which that declaration was made prove to be unfounded.

5.2.7 In subparagraph 5.2.4 above, "act of emergency" means the enactment of any law or the promulgation of any regulation, decree, edict or order, or any other action by or on the part of any Governmental authority, agency or office, or the making of any order by any court, the objective purpose or effect of which is:

(a) to restrict in whole or in any material part the use, investment or distribution of any of the assets comprised in the Trust Estate; or

(b) the acquisition, expropriation or confiscation of any of the assets comprised in the Trust Estate; or

(c) the restriction, suspension or abrogation, modification or variation in whole or in any material part of this Trust; or

(d) to compel the Trustee to terminate this Trust prior to the Termination Date, or to compel the Trustee to take any action or decision or do any other thing that would have the consequence of terminating this Trust prior to the Termination Date.

5.3 Accountings. Prior to the legal death of the Settlor, unless waived by the Settlor, the Trustee shall render an accounting at least annually for this Trust by submitting to the Settlor a record of receipts, disbursements, distributions, gains, losses, assets on hand at the end of the accounting period and other pertinent information. Following the Settlor's legal death,

~~the Trustee shall render such an accounting to the Trust Advisors.~~

Written approval of an accounting by the persons entitled to receive it will (as to all matters shown in the accounting) be binding upon all persons who are then or may at any time thereafter become entitled to an interest in this Trust. The persons entitled to the accounting will be deemed to have given their written approval if they do not object in writing to the Trustee within sixty (60) days after the date of mailing of such accounting by the Trustee. The Trustee may, in its discretion, petition for judicial settlement of the accounting, said petition to be at the expense of the Trust Estate.

5.4 Liability of Trustee. The Trustee shall be discharged from any further liability in respect of the whole or any part of the Trust Estate which is transferred to any person interested under this Trust or otherwise pursuant to the terms of this Trust. The Trustee shall not be liable for any loss to the Trust Estate arising as a consequence of the failure, depreciation or loss of any investments made in good faith, or by reason of any mistake or omission made in good faith, or of any other matter or thing except fraud, willful misconduct or gross negligence on the part of the Trustee. Without limiting the generality of the foregoing, the Trustee shall not incur any liability whatsoever arising from:

(a) the negligence or fraud of any agent appointed or employed by the Trustee in good faith; or

(b) anything done or omitted in conformity with any advice given or purporting to have been given by any investment adviser or manager appointed or employed by the Trustee in connection with this Trust, or the delegation to any such adviser or manager of all or any of the Trustee's powers and discretions with regard to making, retaining, or varying investments.

No successor Trustee shall be liable for any act, omission, or default of a predecessor Trustee. No successor Trustee shall have any duty to investigate or review any action of a predecessor Trustee and may accept the accounting records of the predecessor Trustee showing assets on hand without further investigation and without incurring any liability to any person claiming or having an interest in this Trust.

5.5 Remuneration. The Trustee of this Trust shall be entitled to reasonable compensation for duties performed hereunder and shall be reimbursed for reasonable expenses incurred on behalf of the Trust. Any Trustee or person connected with a Trustee who is an attorney or accountant, or who is engaged in any other profession, business or trade, shall be entitled to charge and be paid out of the Trust Estate his usual professional or other charges for work or business done or transacted, or time expended by him or his firm or any employee or partner of his firm, in the administration of the Trust, including acts which a Trustee not being in that profession, business or trade could have done.

5.6 Bond. No Trustee named in this instrument, or appointed by the Trust Advisors, need post bond.

ARTICLE SIX

DIRECTIONS TO TRUSTEE

6.1 General Instructions.

6.1.1 Immediately following the legal death of the Settlor, the Trustee shall assume and become responsible for discharging all of the Settlor's obligations under his agreement with CryoCare Foundation or any other cryonics organization with which, at the date of his legal death, he may have a contract for the cryonic suspension of his human

remains; and immediately following the collection of the proceeds of all policies of insurance on the Settlor's life payable to the Trustee, the Trustee shall pay to such organization, as an expense of the Trust, all sums which may than be payable to cover the initial costs of cryonic treatment of the Settlor's human remains.

6.1.2 The Trustee shall pay, as an expense of the Trust, the annual costs related to the cryonic suspension of the Settlor's human remains.

6.1.3 Trustee shall pay, as an expense of the Trust, the costs of an attempted resuscitation, litigation to preserve this Trust and the Trust Estate, or for a change to an alternate method of preservation in accordance with subparagraph 7.2.4 hereof.

6.1.4 The Settlor understands that cryonic suspension of his human remains may be impossible or impracticable for several reasons, including contagious disease, mutilation by autopsy, inadvertent embalming, the failure of this Trust, by direction of a court, where no competent Trustee or service provider can be found to continue the Trust, acts of God, exhaustion of funds, in situations where the Trust Advisors may direct that the suspension cease or not commence, or some other reason. Should a traditional form of interment be required, it shall be done by burial in a location with sub-freezing temperature. All funds in this Trust Estate shall then be disbursed according to the provisions of paragraph 2.5 hereof. Subsequent to such final interment, and upon distribution of all the funds of this Trust, the Trustee shall be discharged and shall be relieved of any further obligations of this Trust.

6.2 Donation of Settlor's Human Remains. The Trustee is authorized to donate the Settlor's human remains to any lawfully acceptable donee pursuant to directions received from the Trust Advisors in accordance with subparagraph 7.2.8.

ARTICLE SEVEN

TRUST ADVISORS

7.1 General Provisions. Trust Advisors shall be appointed, hold office, take action and be compensated in accordance with the following provisions:

7.1.1 There shall at all times be at least three (3) persons holding the office of Trust Advisors. At any time that the number of persons holding the office of Trust Advisor falls below three (3), the Settlor, if living and capable of making such appointment, and if not, a majority of the remaining persons holding the office of Trust Advisor shall, by written instrument delivered to the Trustee, revocable or irrevocable, appoint any person (hereinafter in this subsection called "appointee") and if more than one, either concurrently or in succession to one another, to hold the office of Trust Advisor; and if an appointee consents to such appointment, the appointee shall become a Trust Advisor in accordance with such appointment.

7.1.2 Except for XYZ, who may serve concurrently as the Trustee of this Trust and as a Trust Advisor, no appointment under the foregoing provisions of this ARTICLE SEVEN shall have any effect if the person appointed is at the time of such appointment serving as the Trustee of this Trust; and if at any time a Trustee would, but for this provision, be a person holding office as a Trust Advisor that person shall forthwith cease to be a Trust Advisor.

7.1.3 On the death of a person holding office as a Trust Advisor he shall cease to be a Trust Advisor, and in the case of a corporation this provision shall have effect with the substitution of a reference to the commencement of the winding up of or the dissolution of the corporation (whichever first occurs) for the reference to death.

7.1.4 A person holding office as a Trust Advisor may at any time, by instrument delivered to the Trustee, retire from being a Trust Advisor and shall upon such delivery cease to be a Trust Advisor.

7.1.5 Upon any change in the persons holding office as Trust Advisors, the Trustee may endorse on or permanently annex to a copy of this instrument maintained by the Trustee for this purpose a memorandum to that effect, and every such notice shall be sufficient evidence to any persons having dealings with this Trust as to the facts to which it relates.

7.1.6 The office of Trust Advisor shall be automatically terminated and vacated if such Trust Advisor, being an individual, shall be found to be insane or of unsound mind or if he shall become subject to any proceedings under any bankruptcy or insolvency laws applicable to him; or if such Trust Advisor, being a corporation, shall enter into liquidation or dissolution proceedings, whether compulsory or voluntary (not being merely a voluntary liquidation for the purposes of merger, consolidation, amalgamation, reorganization or reincorporation).

7.1.7 Any power of the Trust Advisors under this Trust shall be validly exercised by a majority of the persons holding the office of Trust Advisor.

7.1.8 The Trust Advisors shall have power from time to time by instrument delivered to the Trustee, revocable or irrevocable, to release or to any extent to restrict the future exercise of any powers conferred on the Trust Advisors under this Trust.

7.1.9 Any person holding office as a Trust Advisor may receive reimbursement from the Trust Estate of any expenses, costs and other liabilities including, without limiting the generality of the foregoing, liabilities for taxes incurred by such person purely by reason of such person's duties relating to this Trust.

7.1.10 Any person holding office as a Trust Advisor who shall be a corporation shall be entitled to act as a Trust Advisor on its usual terms and conditions in force from time to time, including (in addition to reimbursement of such corporation's proper expenses, costs and other liabilities) the right to remuneration and the incidence thereof; and in addition, such corporation, or any person connected with such corporation, being a banker may, without accounting for any resultant profit, act as banker and perform any service on behalf of this Trust and on the same terms as with a customer.

7.1.11 Any person holding office as a Trust Advisor, or person connected with a Trust Advisor, who shall be an attorney or accountant, or engaged in any other profession, business or trade shall be entitled to charge, be reimbursed, and be paid out of the Trust Estate his usual professional or other charges for work or business done or transacted or time expended by him or his firm, or any employee or partner of his, in the execution of, or otherwise in relation to, this Trust, including acts which a Trust Advisor not being in that or any profession, business or trade could have done.

7.1.12 Nothing in this Trust shall prevent any person holding office as a Trust Advisor, or any person connected with a Trust Advisor, from contracting or entering into any financial, banking or other transaction with the Trustee or any corporation whose shares or securities form part of the Trust Estate, or from being interested in any such contract or transaction, and no person holding office as a Trust Advisor shall be liable to account to any person interested under this Trust for any profit or benefit made or derived by such person holding office as a Trust Advisor thereby or in connection therewith.

7.2 Directions to Trust Advisors.

7.2.1 The Trust Advisors, or if there are none capable of doing so, the Trustee shall ensure that any agreement between the Trustee and those providing cryonic services to the Settlor shall contain a provision allowing termination of the contract upon 60 days written notice, and termination immediately for cause. These termination provisions shall not be required in contracts for materials, supplies, or equipment, or in contracts that do not involve the actual maintenance of the Settlor's human remains. All such contracts shall require that those providing services secure the written consent of the Trustee before their duties under the contract can be assigned.

7.2.2 The Trust Advisors, or if there are none in existence who are capable of doing so, the Trustee shall investigate the continued maintenance of the Settlor's human remains no less than once annually to determine that the terms of the contract are being fulfilled, and shall require prompt notice by the service provider in the event there is any interruption in the cryonic suspension.

7.2.3 The Trust Advisors, or if there are none capable of doing so, the Trustee is directed to investigate the quality and expense of cryonic suspension services provided by other persons, as such services become available. If the Trust Advisors or Trustee, as the case may be, determine that changing cryonic service providers will increase the probability that an attempted resuscitation of the Settlor's human remains will be successful, the Trustee shall be directed to do so. The evaluation of whether such a change will increase the probability that an attempted resuscitation will be successful is to be made solely in the best judgment of the Trust Advisors or Trustee, as the case may be.

7.2.4 Should the preservation of the Settlor's human remains become impractical due to insufficient funding, changes in technology, the condition of the human remains, or some other reason, the Trust Advisors, or if there are none in existence who are capable of doing so, the Trustee are directed to alter the method of the suspension provided, choosing the method that is most likely to achieve successful resuscitation within the financial limits of the Trust Estate.

7.2.5 The Trust Advisors, or if there are none in the existence who are capable of doing so, the Trustee shall cause records to be maintained noting the cause of the Settlor's death, the nature of the Settlor's human remains prior to cryonic suspension, medical records related to the Settlor's human remains, if available, and a precise report of the procedures used for the initial cryonic treatment of the Settlor's human remains, and shall obtain a determination of

what technological advances are required to create a reasonable probability that an attempted resuscitation will be successful, copies of which records, report and determination shall be given to the Trustee who shall preserve them for future reference. The Trustee Advisors, or if there are none capable of doing so, the Trustee shall determine when an attempted resuscitation shall be made.

7.2.6 The Settlor understands that resuscitation techniques are experimental in nature and holds Trustee and all those participating in an attempted resuscitation of the Settlor's human remains free of all liability in the event the attempt fails.

7.2.7 Should the resuscitation attempt fail, the Trust Advisors, or if there are none capable of doing so, the Trustee shall determine whether to re-suspend the Settlor's human remains, engage alternate techniques for maintaining the remains, or to direct a traditional form of interment in accordance with the Settlor's directions. The determining factor in making this decision shall be whether the probability of successful resuscitation will be preserved by some form of continued cryonic treatment.

7.2.8 The Trust Advisors shall direct the Trustee to donate the Settlor's human remains to any lawfully acceptable donee if such would increase the probability that an attempted resuscitation of the Settlor's human remains will be successful.

7.3 Meetings of Trust Advisors. The Settlor, while holding office as a Trust Advisor, shall serve as the Chairman of the Trust Advisors and shall call and preside at all meetings of the persons holding office as Trust Advisors from time to time.

ARTICLE EIGHT

ADMINISTRATIVE PROVISIONS

8.1 Powers of the Trustee. To carry out the provisions of this Trust and subject to any limitations expressed herein, the Trustee shall have the following powers and discretions with respect to this Trust until final distribution, in addition to any now or hereafter conferred by law:

8.1.1 To receive, hold, manage, care for, protect, and retain for any length of time (without a duty of diversification), or sell or exchange and otherwise deal with, the assets originally transferred to and comprising this Trust and those subsequently received from the Settlor or the Settlor's personal representative, or from any other person or entity as well as stock dividends, warrants, rights, and shares of stock or other additional, exchanged, distributed, or substituted securities received on account of stock or securities held or received upon the exercise of warrants or rights to purchase the same, whether or not the assets so received, held, or purchased would in the absence of this provision comply with the rules now or hereafter prescribed by law for diversification or the investment of trust funds.

8.1.2 To convert real or personal property into other properties; to sell at public or private sale, assign, transfer, convey, exchange, lease, pledge, mortgage, borrow upon and execute security therefor, insure, deal with and dispose of, grant options, and take any other action with respect to any and all of the assets at any time and from time to time included in this Trust, to such person, firms, or corporations, for such periods, upon such terms and conditions, and in such manner or for such consideration as may seem to the Trustee to be in the best interests of the beneficiaries hereof, and no purchaser or mortgagee or other person dealing with the Trustee shall be obligated to see to the application of the purchase or mortgage money or other funds.

8.1.3 Upon the sale, exchange, collection, or realization of or upon any of the stock, securities, or other assets of this Trust, from time to time to invest and reinvest the proceeds thereof, and to invest and reinvest any other funds of this Trust, in any type of real or personal property, either within or without the state where this Trust is administered, in any amounts or proportions, or to hold cash uninvested, all without restriction or limitation by rules of diversification or any other rules now or hereafter prescribed by law or any jurisdiction relating to the retention of trust assets and/or the investment of trust funds which might apply but for this provision; to exercise options with respect to stock or other assets; to purchase any assets from any person, firm, or corporation (including a beneficiary or the personal representative of the estate of the Settlor, or a beneficiary hereunder; provided that a purchase from such beneficiary or any such estate shall be made at the fair market value of the property), it being intended hereby to vest in the Trustee the fullest possible discretion in the investment of trust funds. The purchase, sale or retention of an asset or other action taken by a non-corporate Trustee for his own account or on his own behalf, so long as not in a transaction involving this Trust, shall in no way be relevant as to the propriety of a purchase, sale or retention of any trust asset or of the

exercise or non-exercise of any other power by the Trustee hereunder.

8.1.4 To deposit trust funds in commercial, savings or savings and loan accounts (including such accounts in a corporate Trustee's banking department) subject to the usual restrictions upon withdrawal in effect at that time.

8.1.5 To compound, compromise, adjust, and settle, or pay or discharge, or litigate, foreclose, contest, arbitrate, or abandon any claim, tax assessment, debt, lien, or obligation asserted against this Trust or any trust assets or any claim in favor of this Trust, whether the same has been filed or allowed, for such consideration and upon such terms and conditions as the Trustee deems to be in the best interests of this Trust.

8.1.6 To borrow money for any purpose upon such terms and conditions as may be determined by the Trustee, and to obligate the Trust Estate or any part thereof by mortgage, deed of trust, pledge or otherwise, for a term within or extending beyond the term of the Trust.

8.1.7 To grant or acquire options and rights of first refusal involving the sale, lease or purchase of any trust assets, including the power to write covered call options listed on any securities exchange.

8.1.8 To create restrictions, easements and other servitudes, with or without consideration.

8.1.9 To lend or relend the Trust Estate, or any part, including the power to make loans to any beneficiary.

8.1.10 To have, respecting securities, all the rights, powers, privileges and responsibilities of an owner, including, without limiting the foregoing, the power to vote, give general or limited proxies, pay calls, assessments, and other sums; to assent to corporate sales or other acts, to participate in voting trusts, pooling agreements, foreclosures, reorganizations, consolidations, mergers and liquidations, and, in that connection, to give warranties and indemnifications and to deposit securities with and transfer title to any protective or other committee; to exchange, exercise or sell stock subscription or conversion rights; and regardless of any limitations elsewhere in this document relative to investments by the Trustee, to accept and retain as an investment any securities received through the exercise of any of the foregoing powers.

8.1.11 To hold securities or other property in the name of the Trustee, in the name of a nominee of the Trustee, or in the name of a Custodian (or its nominee) selected by the Trustee, with or without disclosure of this Trust, the Trustee

being responsible for the acts of such Custodian or nominee affecting such property.

8.1.12 To carry insurance of such kinds and in such amounts as the Trustee, in its discretion, shall consider advisable, at the expense of the Trust to protect the Trust Estate and the Trustee personally against any hazard.

8.1.13 To advance money for the protection of the Trust, and for all expenses, losses and liabilities sustained or incurred in the administration of the Trust or because of the holding or ownership of any Trust assets, for which advances, with interest, the Trustee has a lien on the Trust assets as against the beneficiary.

8.1.14 To prosecute or defend actions, claims or proceedings for the protection of Trust assets and of the Trustee in the performance of its duties.

8.1.15 To pay any expense for the management, collection or protection of the Trust Estate, and any taxes or assessments of whatsoever nature and wheresoever arising becoming payable in any part of the world that may be levied upon the Trust Estate or its income.

8.1.16 To employ persons, corporations or associations, including attorneys, auditors, investment advisers or agents, even if they are associated with the Trustee, to advise or assist the Trustee in the performance of its administrative duties; to act without independent investigation upon their recommendations.

8.1.17 To determine what is income or principal of the Trust Estate, what items shall be charged or credited to either.

8.1.18 Upon any division or partial or final distribution of the Trust Estate, to partition, allot and distribute the Trust Estate in undivided interests or in kind, or in money, or partly in any of them, at such valuations and according to such method or procedure as the Trustee determines, including the power to distribute all or a part of any particular asset to any beneficiary without being required to equalize the aggregate income tax bases of the assets distributed to the various distributees.

8.1.19 To execute and deliver all documents which will accomplish or facilitate the exercise of the powers of the Trustee.

8.1.20 To keep any or all of the property of this Trust at any place or several places within or without the United States, or with a depository, nominee or custodian

including any broker or dealer, and held in any type of account, at such place or places.

8.2 Grant of Powers Not Limited. The enumeration of certain powers of the Trustee shall not limit its general powers, the Trustee being hereby vested with and having as to the Trust Estate and in the execution of this Trust all the rights, powers and privileges which an absolute owner of the same property would have; provided, however, that all such powers shall always be exercised in a fiduciary capacity.

8.3 Release of Powers. The Trustee shall have power from time to time by written instrument, revocable or irrevocable, to release or to any extent restrict the future exercise of any powers conferred on it by this Trust or by law, notwithstanding the fiduciary nature of any such powers.

8.4 Modification and Correction. The Trustee shall have power from time to time by written instrument to modify or vary any of the provisions of this ARTICLE EIGHT or to add any provisions thereto, in such manner in all respects as the Trustee may consider advisable, or to correct any manifest errors in this instrument; PROVIDED ALWAYS THAT the power conferred by this paragraph shall only be exercisable if the Trustee shall be advised in writing by a lawyer of at least ten (10) years standing, practicing in the jurisdiction of the governing law, that it would be advisable for the purposes of this Trust that such provisions be modified, varied or added to, or such errors be corrected, in the manner specified in such written advice.

8.5 Change of Governing Law. Following the death of the Settlor, should this Trust ever become subject to termination under

the "Rule Against Perpetuities," any other rule of law limiting the duration of trusts, or any rule of law limiting the duration of income accumulation from other than real estate, the Trust Advisors, or if there are no Trust Advisors in existence who are entitled to exercise and capable of exercising this power, the Trustee shall declare that the governing law of this Trust shall be the law of some other place in any part of the world under which this Trust shall not be subject to termination or limitation under any such rule of law, and under which the terms of this Trust shall otherwise be capable of taking effect; and such law shall thereupon become the governing law of this Trust, subject to the power conferred by this paragraph and until any further declaration be made under such power; PROVIDED ALWAYS THAT whenever any such declaration as aforesaid shall be made, the Trust Advisors or the Trustee, as the case may be, shall be at liberty to make such consequential alterations or additions in or to the powers and provisions of this Trust as the Trust Advisors or the Trustee, as the case may be, shall consider necessary or desirable to ensure that the powers and provisions of this Trust shall be as valid and effective as they are under the laws of the State of California.

ARTICLE NINE

PAYMENT OF TAXES

Upon the death of the Settlor, the Trustee may pay (a) the costs and expenses, including attorneys' fees, necessary to the institution of any legal proceeding and the filing of any tax returns required to determine the amount of federal estate or other

death taxes arising by reason of the death of the Settlor, and
(b) the amount of federal estate or other death taxes arising by
reason of the inclusion of the Trust Estate, or a portion thereof,
in the taxable estate or as taxable property of the Settlor.

ARTICLE TEN

MISCELLANEOUS

10.1 Definitions. The following words used in this
instrument have the following meanings:

10.1.1 The term "governing law" means the law by
which, from time to time, this Trust is to be governed and in
accordance with which it is to be interpreted.

10.1.2 All references herein to the "Internal Revenue
Code," or any section thereof, shall be deemed to refer to the
Internal Revenue Code of 1986, as amended and as it may
hereafter be amended, or to any subsequently enacted provision
of law replacing said Code or any section thereof.

10.1.3 The term "person" includes individuals,
corporations, or unincorporated associations.

10.1.4 The term "Trust Advisor" means the Settlor,
his son Jeffrey Thorp, and his daughter Karen Thorp, and
thereafter the person for the time being holding the office of
Trust Advisor in accordance with the provisions of ARTICLE
SEVEN hereof.

10.1.5 All references herein to the "Trustee" include
not only the original Trustee, but also any successor Trustee
or Co-Trustee while qualified and acting hereunder.

10.2 Determination of Death. The legal death of the Settlor
or a Trustee who is an individual will be evidenced by presentation
of a certified copy of such individual's death certificate to the
Trustee.

10.3 Singular to Include Plural; etc. Whenever used in this
instrument, and to the extent appropriate, the masculine, feminine

or neuter gender include the other two genders, and the singular includes the plural and the plural includes the singular.

10.4 Governing Law. Subject to the powers conferred on the Trust Advisors or Trustee, as the case may be, by paragraph 8.5 hereof, and to each and every exercise thereof, the laws of the State of California in force from time to time shall govern the validity, construction, effect and administration of this Trust.

10.5 Severability. If any provision of this instrument is invalid, illegal or unenforceable in any respect, the validity, legality and enforceability of the remaining provisions of this instrument shall not in any way be affected or impaired thereby.

10.6 Counterparts. This Trust may be executed in duplicate or more counterparts, each of which shall constitute an original trust instrument for all purposes hereunder.

IN WITNESS WHEREOF, this Instrument of Trust has been duly executed as of the day and year first above written.

SETTLOR:

ABC

TRUSTEE:

XYZ