5-1-1959

# Ways in which polymer tempera medium and its associate materials can enrich art expression at the public school and adult levels

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# WAYS IN WHICH POLYMER TEMPERA MEDIUM AND ITS ASSOCIATE MATERIALS CAN ENRICH ART EXPRESSION AT THE PUBLIC SCHOOL AND ADULT LEVELS

A Thesis

Presented to

the Faculty of the Department of Art

Indiana State Teachers College

In Partial Fulfillment

of the Requirements for the Degree

Master of Arts

by

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May 1959

THESIS APPROVAL SHEET

The thesis of Mabel Mikel Williams, Contribution of the Graduate Division, Indiana State Teachers College, Number 792, under the title -- Ways in Which Polymer Tempera Medium and Its Associate Materials Can Enrich Art Expression At the Public School and Adult Levels is hereby approved as counting toward the completion of the Master's Degree in the amount of 8 hours' credit.

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6/26/59 KB

To

Vaughn, my husband

and

Ruth, my sister

Who have stood by

## Preface

Only in recent years have art educators and classroom teachers come to realize the importance of the art class as a medium of democracy, a natural means of expression; and an area rich in opportunities for individual and group guidance.

Here the peer group is relaxed, working individually, and at times together, giving and taking ideas that result in a unit of work that is a part of everyone involved.

It is the writer's contention that any procedure or the use of any material or group of materials that give promise of affording enrichment to individual expression in any area at any age level is worthy of consideration.

Such consideration has been given the Polymer Temper unit of materials, Polymer Tempera Medium, Polymera Extendor, and Polymera Clay Powder, which can enrich art expression at the public school and adult levels.

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## THE PROBLEM AND ORGANIZATION OF THE THESIS

### I. THE PROBLEM

Statement of the problem. After learning of the possible aid Polymer Tempera Medium, and its associate materials, Polymera Retarder and Polymera Clay Powder, might offer in the enrichment of art expression, the writer planned a procedure in the form of a series of experiments in the areas of painting, sculpture, transparencies and crafts, to determine the quality and worth of these materials in relation to art expression at the public school and adult levels, when used in combination with established art media known to be water soluable.

Purpose of the study. The purpose of this study was not to present a course of study, or a series of art lessons, in the areas of painting, sculpture, transparencies and crafts, but to investigate and evaluate a comparatively new product unit that promised to enrich the art program at the public school and adult levels.

The reasons for the study may be enumerated as:

1. To aid the classroom teacher in helping to solve the problem of interest span, messiness in the production of craft units, in counteracting allergies, and in helping to

solve the problem of limited space.

2. To aid the teacher and student of painting at the adult level.

3. To enrich the possibilities of experiment for painter, sculptor, and craftsman.

4. To ascertain the worth of the Polymer Tempera unit of materials when used as sealer, adhesive, and binder.

## II. ORGANIZATION OF REMAINDER OF THE THESIS

The development of the study included:

1. A survey of literature and definition of terms establishing the chemical background of the materials and the philosophy of procedure involved in setting up the study.

2. A review of historical and philosophic literature in the field of art education.

3. An investigation of the claims made by the Polymer Tempera Company as reported in their Handbook and Handbook Supplement.

4. An evaluation of materials used in relation to different forms of art expression.

5. A test of the materials by actual usage in the areas of painting, sculpture, transparencies, and crafts, presented in the form of illustrated experiments.

6. A summarization (1) to offer a degree of proof that the materials investigated can enrich art expression at

the public school and adult levels, (2) to establish art expression as a medium of democracy, and (3) to consider the possibility that the world wide exchange of art experiences in the form of visual art may help lay the foundation for world peace.

# CHAPTER II

## SURVEY OF LITERATURE AND DEFINITIONS OF TERMS USED

### I. ESTABLISHING THE CHEMICAL BACKGROUND OF THE MATERIALS INVOLVED IN THE STUDY

In establishing authority to support the writer's belief in the quality and value of Polymer Tempera Medium, it was necessary to know something of the general meaning of the word POLYMER, its historical background in order to determine the approximate value of Polymer Tempera Medium as released by the Polymer Tempera Company, Inc., which is the major material explored in this study; and to further ascertain its value over other similar products.

From a dictionary:

> Polymer: Definition is derived from the Greek, first appeared in the English language in 1830. . . . Chemical substance polymeric with another; any one of a series of polymeric compounds. 1886 Roscoe Elem. Chemistry, 314 cyanuric acid. . . . This polymer of cyanic acid is a solid crystalline formed on a heating area. 1889 Croll Stellar Evol. 95. The bodies thus formed are known as polymers. Polymerik is after the German polymerik (Berzelious 1830) of two or more compounds, or of one compound in relation to another, (consistent with) composed of the same elements in the same proportions but so that the number of atoms of the several elements in the molecule in one substance are some multiple of those in another.[1]

Another definition:

Substance (often synthetic) composed of group molocules

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[1] Oxford English Dictionary, Vol. VII.

that have been formed by the union of a considerable number of simple molocules one with another. The number of simple molocules that unite to form a polymer molocule varies from two to a hundred or a thousand. The simple molocules that will undergo such a change are known as monomers and their union is called polymerization. The monomer molocules may all be alike, or there may be two or more variations of monomers worked in the formation of a particular polymer. Thus ethylene molocules can be united with themselves to form polyethylene plastic such as polymer. On the other hand, G.R.S. synthetic rubber (the most common type) is a co-polymer since two different kinds of monomers (styrene and butadiene) are required, and thus the molocular weight of the one is the same multiple as that of another.[2]

The definition of Getteus and Stout:

The polymerization process is usually accompanied by a change in state (as liquid to solid) and a transfer of energy. A. A polymerized substance is often named with the prefix, Poly--e.g. polyvinyle acetate, Polymer Glossary, p. 331.[3]

Further defined: Powell reviews the amazing growth in the use of vinyl coatings during the past twenty-five years.

The vinyl plastics are recognized today as one of the most important raw materials of the coatings industry. Technically any polymeric resin can be classified as a vinyl resin if it is prepared by the polymerization of a vinyl group Ch-Ch x, where X can be almost anything. Hence, one can classify polystrene, polyethelyene and the acrylic, methacylic, any allylic resins as vinyls, but the term is usually limited to vinyl chloride and vinyl acetate--polymer and eopolymeis. . . . Vinyl acetates have some unique properties which comment it, especially its clarity, solubility, and stability, but is deficient in water resistance.[4]

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[2] Condensed Chemical Dictionary (5th edition; New York: Rienhold), p. 881.

[3] Rutherford J. Getteus and George L. Stout, Painting Materials (New York: Van Nastrand Co., Inc., 1942).

[4] G. M. Powell, The Freer Gallery of Occasional Papers, August 6, 1951, p. 32.

The reader will note that the above address was based on chemical findings in and before the year 1951.

The Polymer Tempera Co., Inc., Boston, Mass., makes an official entry describing Polymer Tempera:

> A line of artists' colors ground in a water dispersion (or emulsion) of polyvinyl acetate, a milky liquid which mixes and thins with water. The manufacturers state that the materials have been especially selected and processed to overcome the shortcomings to which some polyvinyl acetate water dispersions are prone.[5]

The Polymer Tempera Medium was put on the market in 1956 by Polymer Tempera Co., Inc., as a separate material segregated from its original combination with the line of artists' tempera colors. Two associate materials were processed simultaneously for public consumption, Polymera Retarder and Polymera Clay Powder, to be used in some instances with Polymer Tempera Medium.

Polymer Tempera Medium defined. Polymer Tempera Medium is a water-dispersed milk-white resin emulsion, which can be freely thinned with water. It becomes water insoluble and transparent when dry; used as a basic binding material, fast-drying Polymer Tempera Medium becomes a vehicle for many pigments and aggregates. Used with water and a great variety of aggregates, many effects, ranging from thin washes to heavy impasto and sculptural masses can be obtained. Because Polymer

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[5] Ralph Mayer, Artists' Handbook of Materials and Techniques (New York: Viking Press, 1957), p. 659.

Tempera layers applied at different times fuse into one mass, the artist or student can combine many techniques in one work, "therby extending ideas beyond the limitations of standard painting," sculpture and craft methods.[6]

Associate Materials defined. Polymera Tempera Retarder is a thick amber colored resin water solution that may lengthen the drying time and improve the brushing out qualities of Polymer Tempera Medium.

In addition to being used in combination with the medium, it can be used as a binder, as a clear coating over drawings and as a sizing.

When combining Retarder with the Medium and color mixture, it should not exceed one-quarter of the total mixture. If too much retarder is used, cracking will appear after the drying period.

If the retarder jells in the bottle, it can be placed in warm water till the resin becomes liquid.

Polymera Clay Powder is a finely ground inert aggregate which can be added to Polymer Tempera Medium to build up a thick buttery paste creating impasto effects. It also extends the pigment dispersed in the medium in large quantities without visible alteration of the intensity of color.

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[6] Polymer Tempera Handbook (Somerville, Mass.: Polymer Tempera, Inc., 1956), p. 1.

Media defined. As an art consultant and teacher, the writer has been impressed by the limitation of storage space within the classroom, which often results in surface experiences during the art period. Teachers, as well as art educators, are striving for true art expression, thereby helping to develop the aesthetic sensibility which is the birthright of every human being.

In order to develop this type of expression, a constant search for "Media for Depth" is underway, both by the classroom teacher and art teacher, as well as by educators as a whole.

However, in the fields of sculpture and crafts, the classroom teacher has not only been confronted with the problem of storage space for class projects but also the lack of space for the storing of objects during the drying periods, and how to live with the odors and messiness during both the actual building and seasoning time spans.

There is also the problem of preservation which is of great interest to creators young and old, alike.

The writer, being highly allergic to such products as turpentine, shellac, and varnish, to mention a few, sympathizes with the child who sneezes and coughs when such materials have been opened in the room for use. In many instances both the classroom teacher and the pupils have favored bypassing crafts projects in favor of simple forms of art experiences such as:

pencil drawings, crayon work, water color painting, and paper construction.

In evaluating the media most helpful in the developing of the aesthetic sense, there are several qualities which should stand the test according to Wilson:

> 1. The medium should be simultaneously relaxing and stimulating. It should be pleasing to handle and to smell, so that it invites manipulation.
>
> 2. The medium should be flexible . . . adaptable to individual differences in attention span, complexity of ideas, muscular control, mood and style of expression. . . .
>
> 3. The medium should provide for obvious and easy interaction, so that at the same time the person is giving himself to the experience, the changing medium is also giving to him. . . .
>
> 4. The medium should help reveal the person's unique style of experiencing the world and expressing his experiences.
>
> 5. The medium should have unique potentialities that are easily recognized such as heaviness of clay, intense color of paint . . . .[7]

Aesthetic Sensibility defined.

> Aesthetic sensibility may be defined as a refinement or intensification of a person's common sense. It is the arrangement of personal knowhow as revealed in 'knowing how much of what goes where in what order and at what time.' 'It is the knowing' of what the person 'likes and wants, what pleases him and what displeases him.' It is the knowing what is important, what goes together, how much is enough, what is monotonous, what is alive, what holds together, what falls apart, what is possible for him

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[7] Francis Wilson, "Media for Depth," School Arts Magazine, February, 1956, pp. 7-8.

> and what is beautiful for him. It is the sense with which he abstracts the essence of reality; it is the sense which can change a sound or a smell or a feeling into a color, line, rhythm, or shape. It is the source of his imagination and of his unique style of experiencing and expressing. It operates to create aesthetic quality not only in the art of process product, but in all experiences in the process of life. The aesthetic sense is also his social sense, his moral sense, his religious sense. It is his source of love. It is his sense of self--of being; it is the same sense which directs his growth--his becoming.[8]

Aesthetic sensibility cannot be taught, but because there are so many factors in league to help destroy it as we leave childhood, art experience at the public school level can help in the unfolding of this aesthetic sense and in maintaining its identity and proportions without too many forms of distortion eating at its natural shape.

At the adult level the rediscovery of the aesthetic sense can best be recognized and developed in an environment of common experiences and development compatible with and pleasurable to the senses.

> After the aesthetic sensibility has been identified or coaxed into use again with genuine respect, with tender loving care, with success, fun and serious foolishness, and with delighted recognition and admiration of what each person really is; after the person, himself, has learned to respect his aesthetic sense, believe in it and delight in it, then and only then can resistance and pain strengthen it, and striving to acquire more knowledge and gaining more skills enrich it. It is not only the tenderest part of a person but also the strongest and the most indestructible.[9]

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[8] Ibid., p. 9.

[9] Ibid.

In considering the important function of the aesthetic sense, the conditions required for its development, and the many factors which cause it to withdraw or remain dormant, the writer of this study maintains that some media on the whole are better than others in the development of the aesthetic sense.

In defining media, the writer has been concerned with the many materials through which art experiences have been expressed. There are certain qualities to look for in evaluating those media which contribute most generously to the discovery, rediscovery, and development of aesthetic sensibility in visual art expression.

In restating some of their qualities, each medium should be relaxing and stimulating; it should be pleasing to the eye, with a good feeling when held in the hands--even pleasing to the sense of smell in order that it may invite pleasant contaction and manipulation. It should invite attention, stimulate curiosity, and promote experiment. It should arouse sensory reaction resulting in the exploration of color, pattern, texture, shape, line movement, and space.

Purpose of creative experience defined. It has been found that through the proper use of tools and wise guidance this aesthetic sense can be identified, to a great degree, with art experiences.

The individual must find his way; he must feel his way before he experiences that which necessitates a seeing, feeling, thinking and doing process; all working as a unit of power propelling the dynamo of his very being. That this power may be unhampered, the tools of expression should be uncomplicated and easy to use, as pleasurable as possible, that his expression may be honestly expressed without involving unnecessary detours of frustration.

In the opinion of the creator of this study, a richer art expression can be experienced by the use of the materials evaluated in this study, together with established media, known to be water soluable. The materials unit of procedures are set up as a way to develop the aesthetic sense, that all persons may have a better understanding of the possibilities of a more meaningful life as may be experienced in the area of art expression at any age level.

# CHAPTER III

## REVIEW OF HISTORICAL AND PHILOSOPHICAL LITERATURE IN THE FIELD OF ART EDUCATION

### I. HISTORICAL BACKGROUND OF ART EDUCATION

In considering the historical background of art education, man has been continuously concerned with how to help develop the potentials of the individual. Since guidance, as a part of the educational process, has become recognized as a tool of the learning process, we have become more aware of what the individual can do for himself in recognizing and developing his own aesthetic sensibility, his potentials.

The whole educational system is striving to help the individual find himself that he may assist in the development of the thing within him that relates him to, and makes him a necessary unit involved in contemporary living, the living of the future and in the possibilities of infinity.

A specialist in any area might suppose his field to be the ideal proving ground for such development. The writer has been accused of being over zealous in that respect; but one must be what he is, working for others with what he possesses. So the quest of this writer has been, and shall be, that of helping to develop the aesthetic sensibility of the individual that he may, to some degree, realize his God-given birthright, his potential, and help the individual to

find the area of service best suited to his talents.

Surveying the fact historically, the art program in the public schools has involved such highlights as:

> In 1749 Benjamin Franklin recommended for his academy, 'Something of drawing by initiation of prints and some of the first principles of perspective.' Note too Franklin said, 'that all may profit.' Early in the 19th century Horace Mann, secretary of the board of education, promoted the legislation 'drawing' for the larger common schools of Massachusetts. Other personalities of this period who promoted art education: Mary Mann, Elizabeth Peobody, Henry Barnard, first commissioner of education in the United States of America, exerted special interest in art education in Connecticut. William Menefe taught cast drawing in the schools of Baltimore, and J. R. Smith published Juvenile Drawing Books throughout the nation. There was an attempt to introduce some form of drawing in the schools.[10]

With the founding of the Pennsylvania Academy of Art, 1795, other schools and influences came to the fore to champion the growth and development of art as a medium of expression; in 1837 the first normal school at Lexington, Massachusetts was founded, and in 1873 the normal school at Boston, Massachusetts became the Massachusetts School of Art headed by Walter Smith of Leeds, England, as master.

At this stage, drawing was pictorially conceived, attempting at perfect representation as dictated by the laws set up pertaining to perspective and detailed rendering. At this point, personalities in the field of general education such as:

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[10] Italo L. DeFrancesco, "Art Education Then and Now," School Arts Magazine, April, 1956, p. 9.

> Frobel the father of Kindergarten, Herbart who anticipated the ideas of Gestalt, Pestalozzi who had emphasized sense perception, and Rousseau who had advocated a child conscious curriculum, were hardly known in this country. Under the leadership of such personalities as William T. Harris, Colonel Parker, G. Stanley Hall, and later the McMurrays, the teachings of those European masters were tangibly infused into American education.[11]

At this stage, art was ennobling; the "ideal," the "beauty," the "truth," of art experiences were stressed--a sort of "in the cloud" type of expression, ever pulled back to earth by the weights of dictated procedures. Toward the end of the century the "arts for arts sake movement" was championed by such men as Henry Turner Bailey who first edited the magazine, School Art Book, now known as the School Arts Magazine. Turner's influence was greatly felt, especially at the public school level of art education.

Other great teachers of the last part of the century included such men as John Dewey experimenting at the University of Chicago. Dewey says that:

> Art is a process of doing and making. Every art does something with material, the body or outside the body, with or without the use of intervening tools, and a view of production of something visible, audible, or tangible.[12]

Dewey as a philosopher is close to Gestalt Psychologists when he sees "order itself as an achievement of harmony emerging

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[11] Ibid.

[12] John Dewey, Art as Expression (New York: Milton Balk, 1934), p. 57.

from tension". . . . Art in Dewey's scheme of things in all its forms--plastic, musical, literary, dramatic--provides a form of expression for the uniqueness of the personality. On this basis we have come to accept the principle that some experience in art is important to everyone. The value being in the development of the constructive and creative element in the personality.[13]

In 1889 the National Education Association, realizing the new significance of art in the educational program appointed "A Committee of Ten on Drawing in the Public Schools."

The committee report on the areas of art education: (a) to develop appreciation of the beautiful; (b) to develop the creative impulse; (c) to offer consistent development of the faculty of insight; (d) to acquire ability to represent; (e) to prepare pupils for industry is purely incidental; and (f) the development of artists is in no sense the aim of art education in the public schools.

The writer of this study set up residence on this earth as a new citizen of the United States near Green City, Missouri. With a willingness to work and learn, and a dedicated belief that art in some degree of realization and development can make every human life more worth the living, and can help to implement the potential of every personality, the writer developed this study.

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[13] Ibid., p. 15.

Through Dow's formulae for design and composition, the dynamic symetry of Jay Hambridge, the reliance put on Aztec prints (by some art teachers) had a tendency to result in a tightness in art procedures. Definite thought was being given to the child as a creator by educators as early as 1924; Margaret Mathias being one such voice crying out.

In 1927, the National Education Association met in Dallas, Texas, and was marked by the birth of a new era in art education; art in the public schools had been made legitimate by the most influential body of educators in the United States of America.

From now on the child was recognized; his needs, his yearnings, and his creative potential were the concern of the community, the parents, and educators.

The 1930's not only threw our country into an economic panic, but also into a maelstrom of emotional tension. Entertainment, because of lack of money, was hard to purchase, so of necessity it had to be created. The art program had already been established as a medium for individual guidance, and served in the capacity of first aid in helping America's young and old to find their way back to normal living. All over the country arts and crafts were introduced to youth groups, and the adult education program got under way. The art program during the years of the "Depression" met with such success that art now became <u>Art for All</u>. The result of the

widening of this program was that there was a better balance of experience including two and three dimensional expressions in the form of working projects.

As a result of working potentials of art education in relation to all, as witnessed in actual experiments during the 1930's, the last two decades have been concerned with re-evaluation and the establishment of a broader philosophy of Art Education and wider application of the psychology of creative activity, a possibility within the reach of human kind.

Consequently art horizons have been expanded to include the home, the school, the community, religion, business, industry, citizenship in our democracy, and world participation and interchange.

It is the belief of the writer that with the widening of art horizons, Art for All is a foregone conclusion. Children and adults alike must be led to realize that an artist is not only a painter of easel pictures but "The artist then is an inventor and an engineer. He makes things both with his hands and his mind--or by extension of his hands called tools and machines."[14]

> We are reminded that today there is no fine art. There is only good and bad art, and no art. Bad art consists of

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[14] Janet K. Smith, A Manual of Design (New York: Reinhold Publishing Co., 1950), p. 12.

> objects ill made, fit for weak or malformed purposes, made of wrongly chosen materials, executed by irresponsible workers--men or machines.[15]

Consequently the art teacher can be of service to potential artists, artisans, and consumers alike by helping the student to acquire a knowledge of what is being done in his own time and what has been done in the past.

The development of such awareness will help all as future consumers to make right choices in purchasing on the open market--where buying wisely encourages the making of fine and serious products rather than giving credit where it is not deserved.

The Public Art Program and the creative potentials of the child's development as a part of that program have been championed by such men as Victor D'Amico in his Creative Teaching in Art, Viktor Lowenfeld in his Creative and Mental Growth, Elizabeth Harrison in her Self-Expression Through Art, and Estelle Hagen Knudson and Ethel Madill Chustenson in their Children's Art Education.

With experiment as a prelude to production, the writer agrees with Joseph Albers--Concerning Fundamental Design.

> To experiment is a first more valuable than to produce; free in the beginning develops courage. Therefore, we do not begin with theoretical introduction; we start directly with the material.

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[15] Ibid., p. 13.

> In order to insure 'first-hand,' manual knowledge of the material, we restrict the use of tools. As the course advances, the possibilities in the use of various materials, as well as their limitations, are gradually discovered. . . .
>
> Our aim is not so much to work differently as to work without copying or repeating others. We try to experiment, to train ourselves in constructive thinking.[16]

What the Bauhaus preached in practice was the common citizenship of all forms of creative work and their local interdependence on one another in the modern world. It made an attempt to help the formal artist recover the fine old sense of design and execution and make him feel that the drawing board was a prelude to the active joy of the complete art expression which could only result in the fashioning of the product which is the expression of art experience. Both art expression in the United States at the public school and adult levels have been greatly influenced by the doctrine born in the Bauhaus, since two of our most influential schools of design and crafts were founded by members of its original faculty. The Black Mountain College of North Carolina was founded by Joseph Albers and Alexander Schaurusky. The American School of Design in Chicago was founded by Maholy-Nagy.

These two schools have had definite and lasting influence

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[16] Herbert Bayer, Walter Gropius, and Isa Gropius, The Bauhaus (New York: Museum of Modern Art, 1938), p. 116.

in establishing and administering Art Education through expression in painting, sculpture, and crafts at all levels in contemporary units of art experience.

## II. THAT ART EXPERIENCE THROUGH EXPRESSION IS A WAY OF LIFE AS A MEDIUM OF DEMOCRACY

> Freedom of expression and the emphasis on individual differences is not only basic to democratic thinking, but is also essential to art expression. Freedom is not anarchy but the highest form of the development process. It is the removal of all unnecessary restrictions which are in the way of growth.[17]

The process of Art Education could then be said to constitute practice in becoming an ideal citizen in a democracy.

## III. PATTERN FOR WORLD CITIZENSHIP

Art is a universal language even among the very young. It is an accepted fact that all children, regardless of age, creed, color, or nationality, draw in almost the same way and can be understood by children at the same level all over the world.

The Art World Friendship movement which was launched in 1946 by U.N.E.S.C.O. had its headquarters in the United States at the Friendly Acres, Media, Pennsylvania. Supplies

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[17] Viktor Lowenfeld, The Meaning of Art Education in a Democracy, N.A.E.A. Yearbook (Kutztown, Pa.: State Teachers College, 1952), p. 77.

have been sent to all parts of the world on request. Among the nations who have benefited from such help are: India, Pakistan, the Phillippines, Italy, Ceylon, Japan, and Israel.

> The exchange numbers have grown steadily; at the end of the first year 1,000 works and fourteen countries composed the contributions from January, 1954, to January, 1955. 20,000 pictures were exchanged from January, 1955, to July, 1955. 8,000 pictures were received at headquarters and an equal number exchanged. Each child who sends a painting receives one in return.[18]

Art for World Friendship is only one of the associations working on the problem of child art in the form of exchange of children's work on the international level, the only one to encourage the participation of the very young.

Our own government and many foreign embassies share our belief that the hope of the world lies in our children.

Idealism at all age levels hungers for the feeling of emotional uplift without appearing to be superficial. In "My Art Creed" Bauser relates idealism to art in:

> I believe:
>
> That life itself is the finest of all arts and that its richest realization is art's extreme excuse for being. . . .
>
> That the mission of art, is to teach a love of beautiful clothes, beautiful households, beautiful utensils, beautiful surroundings, and all to the end that life itself may be rich and full of beauty in its harmony, its purposes, its ideals. . . .
>
> That all progress in art lies in the expression of

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[18] Maude Muller, "Art for World Friendship," School Arts, May, 1956, p. 17.

the experiences, the hopes, the ideals and the aspirations of our times, and of our own lives.[19]

Bauser follows these three statements with a reaching for the infinite in "I believe that the appreciation of beauty in the thousand common things of daily life will result in the final appreciation of beauty as a disassociated ideal."[20]

If art expression can be established as the birthright of the individual, functioning as a medium of Democracy, and helping to establish world peace through universal understanding; any means, media, or material is worth consideration if they promise to aid, in even a small way, in the realization of the dream of all free men, "Peace on Earth".

In the opinion of the writer, the Polymer Tempera materials explored in this thesis have contributed and will contribute and aid future processes, in helping to realize and preserve the experiences as a result of art expressions at all age levels. The simplicity of the process, the durable qualities of the projects made and treated, in combination with the products explored, make them desirable in the areas of painting, sculpture, transparencies, crafts, and many art fields that are yet to be explored.

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[19] Frederick G. Bauser, "My Art Creed," Progressive Education, June, 1926, p. 104.

[20] Ibid.

# CHAPTER IV

## INVESTIGATION OF MATERIALS AS REPORTED IN THE POLYMER TEMPERA HANDBOOK

> The range and versatility of the Polymer Tempera Medium make it unique in art mediums. It has met with success at all levels, from the child in the classroom to the professional artist, because it encourages experimentation and discovery and is highly adaptable.[21]

The unique chemical properties of Polymer Tempera are the results of modern scientific research, having been found to be a vehicle with adhesive and binding qualities which are far more flexible and adaptable to varied uses than most traditional binders and adhesives. It has also permitted in this experiment a range of effects and combinations with media and aggregates hitherto unfamiliar to the writer.

The following is a list of the characteristics that make Polymer Tempera a unique and desirable artist's medium.

1. It is rapid drying.

2. It can be thinned with water.

3. It becomes water resistant when dry, therefore washes may be overpainted without danger of bleeding.

4. It allows for extensive overpainting without impairing permanency. Successive layers need not be graded according to thickness.

5. It permits many otherwise imcompatible techniques

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[21] Polymer Tempera Handbook (Somerville, Mass.: Polymer Tempera, Inc., 1956), p. 1.

to be combined in one work.

6. This basic binder is compatible with many forms of color: dry pigment, water-dispersed pigments, and most paints which have organic gums as binders.

7. It is compatible with inert aggregates such as sand, vermiculite perlite, marble dust, flour, and talc.

8. Dry Polymer Tempera paintings are insoluble in water, and can be cleaned with a damp cloth.

9. Polymer Tempera paintings are unaffected by light, heat, or weather. They will not crack, yellow, or darken with age. (This applies, of course, only if the coloring matter is good.)

10. Polymer Tempera is noninflamable and non-toxic.[22]

The following is a list of additional characteristics making Polymer Tempera Medium valuable at the public school art education level:

1. Can be used in many ways:
   a. Painting.
   b. Sculpture.
   c. Puppets.
   d. Three-dimensional models.
   e. Craft projects.
   f. Can be mixed with a variety of materials to obtain a clay-like consistency. (Cement, whiting, vermiculite, paper mache', and sawdust are a few examples). All of the above mixtures are easily worked, can be carved into

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[22] Ibid., p. 2.

after a drying period, and can be added to if the dry surface is remoistened. Some of the advantages of these mixtures are (1) dry quickly, (2) won't crack, (3) color may easily be added to the mixture when wet, (4) early techniques are simple, but offer great opportunities for experimentation, (5) projects are lightweight, easily managed, (6) Polymer Tempera colored glazes can be easily applied as final coats on dry clay, and (7) transparencies can be made by combining color pigment, transparent or opaque, with Polymer Tempera Medium puddled within plactacine retaining walls until a solid consistency is achieved after the proper drying method.

The findings as a result of the experiments offered in the study, prove the validity and worth of the materials under consideration. These specific findings are noted under the general divisions--painting, sculpture, transparencies, crafts and further findings--as enumerated in the Polymer Tempera Handbook Supplement.

# CHAPTER V

## THE EVALUATION OF THE MATERIALS USED IN RELATION TO DIFFERENT FORMS OF ART EXPRESSION

This chapter reviews specific uses of Polymer Tempera Medium and its associate materials, Polymera **Retarder** and Polymera Clay Powder, as have been enumerated; in the areas of art expression as related in the fields of painting, sculpture, transparencies and crafts, as well as further evaluations of the materials as described in Polymer Tempera Handbook. In relation to painting procedures the facts concerning proper supports for painting have been considered.

Uses of the materials in relation to painting. Though most standard supports can be used in combination with Polymer Tempera paint formulas, certain types have been found to be very satisfactory.

Polymer Tempera Medium can be applied directly to standard canvas support without causing deterioration; Polymer Tempera treated canvas can be rolled or unrolled at room temperature of about 70°.

Rigid supports, plywood, and untempered masonite board should be sanded lightly to remove water repellant finish. Either commercially prepared gesso or Polymer Tempera gesso can be used as a ground over plywood or masonite board, though Polymer Tempera gesso has been found to be stronger, more

stable, and more readily compatible with overpainting which has the Polymer Tempera Medium in its formula.

For variations in texture, a number of materials have been successfully applied over masonite board, plywood, wallboard, or canvas board, to name a few; muslin, crinoline, curtain materials, burlap, which may in turn be surfaced with gesso, ground glue, whiting, sawdust, and sand as illustrated in the photographed evaluations in this study.

Polymer Tempera washes may be applied on standard water color papers. Lightweight papers may be sized on both sides with a solution of the medium and water to make the paper harder, more durable, and a surface more suitable to the mediums of painting, and pastel, alone or combined with aggregates.

Chip board can be treated in the same way and is ideal for students involved in the experimental stage, yet provides a good working surface and is quite durable. The medium may also be used on cardboard and celotex.

General instructions in the uses of Polymer Tempera Medium and its associate materials, Polymera Retarder and Polymera Clay Powder in the mixing and application of paints, the use and care of brushes and storage of prepared media have been explained.

Polymer Tempera Medium can be mixed directly with dry pigments, caseins, water colors, inks, dyes, and other compatible

materials. The mixtures can be stored in glass jars or used directly from the palette. The writer found a plastic ice cube tray to be an ideal palette since it could be covered with a plastic bag and stored for continuous use over a period of three weeks or more. When Polymera Retarder is used in combination with dry or moist color pigment and Polymer Tempera Medium, the resulting color formula can be stored for an indefinite length of time.

To test the compatability of a paint such as casein with Polymer Tempera Medium, mix the two together; (any coagulation caused by borax content in the casein will occur at once.)

Colors mixed with a large amount of medium will be temporarily affected by the white in the medium when wet, but will return to their original intensity when the medium dries. The medium can be thinned with water or thickened by adding clay powder or other aggregates for impasto effects.

Either oil brushes or water color brushes can be used; however, brushes should always be immersed in water before using. After the painting period, brushes should be washed in soap and warm water, rinsed in clear water. If medium hardens the brushes, they can be softened in full solution of Lestoil, then washed in warm water.

Glass, plexiglass, plastic, or any nonabsorbent surface may be used for a palette. A paint-hardened palette can

be easily cleaned by soaking overnight with a wet paper.

General precautions include: avoid Polymer Tempera Medium formulae storage in iron, tin, or galvanized metal containers as they will discolor the medium. Polymera Tempera may be stored indefinitely in tightly sealed, plastic or glass containers at normal room temperatures. If frozen permanently, they coagulate. When rolling Polymer treated canvas make sure it isn't cold as the surface may crack.

All Polymera Tempera dispersions can generally be handled without danger of skin irritation. Prolonged contact with the skin should be avoided to prevent possible irritation to over-sensitive skin.

Uses of materials in relation to sculpture. Polymer Tempera Medium may be used as an important ingredient in conventional mixes of cement and plaster for making sculpture, and increasing the cohesiveness of these materials. Pieces may be cast or built up in the manner of modeling with clay. The finished pieces may be sanded, chiselled or buffed. More masses can be added at any stage, for the presence of Polymer Tempera in the mixture makes possible a chemical bond between the original work and subsequent applications. Surface textures of great variety are possible by the introduction of various inert aggregates. Any desired color may be added when wet or the finished piece may be painted with Polymer Tempera Medium in combination with color pigment.

Though Polymer Tempera Medium may be used as the sole binder with aggregates to make a plastic workable mass, this method is not recommended except for small pieces, as experiment revealed the fact that Polymera Tempera Medium will not dry quickly in large masses. However, if cement or plaster is added, the mixture will harden much more rapidly as a result of the natural crystallization of these minerals.

These aggregates may be used with Polymer Tempera cement mixes to increase workability and to add bulk and texture:

| | | |
|---|---|---|
| Paper pulp | Shredded asbestos | Textile fibers |
| Ground cork | Sisal hemp | Wood flour-Solka floc |
| Clay | Kaolin | Sand |
| Talcum | Perlite | Expanded mica, vermiculite |
| | | Granulated stryfoam |

Brass, steel or copper can be used for armatures, but iron, tin, or galvanized metal will discolor the medium. Apply Polymer Tempera mixture in layers like clay, letting each successive layer harden before applying the next. When applying a new layer, dampen slightly with Polymer Tempera mixture the previous layer to insure a stronger bond between the two layers.

Because of the effects of weather, specific proportions are suggested for outdoor sculpture. Polymer Tempera Medium should be added in the standard proportions for concrete mixes. Water content will depend on the absorbency of the aggregate.

A typical proportion of materials would be:

4 parts dry cement.

1 part Polymer Tempera Medium.

Aggregates and water as required.

Combine the cements and aggregates dry. Mix the medium and water in a separate container, and then add to the dry ingredients. Add more water if the mixture is not workable.

When casting Polymer Tempera cement, the moulds should be coated with a material that is not compatible with the medium.

For children's work in clay, Polymer Tempera Medium makes a good nonfiring glaze, incorporating the gloss of a true glaze without the hazards, time element and complications of kiln firing. Size the piece of dry clay with one part Polymer Tempera Medium and one part water. Then paint with a solution one part water and one part Polymer and color. Additional coats of Polymer Tempera Medium solution can be painted on top of this to increase depth of the gloss.

Though these finishes are water resistant, they are not suitable for anything but decorative purposes.

Uses of materials in relation to painting and transparencies. The great versatility of Polymer Tempera has been proven in still another field of art experience--that of Polymer Tempera transparencies, by the formation of Polymer panes. If poured on a nonabsorbent surface inside walls of

desired shape, pure Polymer Tempera Medium in combination with transparent coloring matter, result in transparencies similar to stained glass windows, after a drying period of approximately 24 hours.

It follows that Polymer Tempera Medium can be poured into troughs of any desired shape to create simulated stained glass window effects, to be used in the making of mobiles, transparent sculpture, and to assist in making other classroom projects more unique and interesting.

General instructions for forming Polymer panes:

1. Use Polymer Tempera Medium undiluted.

2. Coloring matter includes the use of inks, dyes, or water colors in small quantities if transparencies are desired. However, if opaque effects are desired, greater quantities of the above may be used as well as poster colors or caseins. The panes may be cut with scissors to the desired shapes before the final stage of hardening. However, after the panes have become hardened, they may be slightly warmed with a light bulb to facilitate cutting and shaping.

The Polymer Tempera Handbook Supplement. Formulas as established and given in the Polymer Tempera Handbook Supplement:

1. Proportions of Polymer Tempera Painting Mixtures. Proportions may be changed for different effects. Use a knife scratch test after drying to determine if there is sufficient medium in the paint film. If the film powders,

use more medium in the mixture and as a painting medium in conjunction with pastel.

2. The recommended proportions for Polymer size which can also be used as pastel or charcoal fixative:

One part Polymer Tempera Medium.
Three parts water. (More water can be added if necessary).

3. Paper mache' with Polymer Tempera Medium.
Soak shredded newspaper or paper toweling in water for 48 hours. Mix medium with soaked shredded paper. Add water to achieve the desired consistency. Sand or other fine aggregates may be added to the mass. The mass is now ready to work over an armature which may be wood, paper, wire mesh or styrofoam are a few suggestions. If styrofoam or wood is used, it must be sized with equal parts of water and medium. Then wrap long strips soaked in solution and wrap around to form a base for finer detail. Work details with shredded paper. When dry, coat finished piece with medium mix, then paint with color and medium if desired.

4. Children's painting.
Small amounts of Polymer Tempera Medium may be added to poster colors, moist or dry, and drawing inks to make them permanent and water resistant.

Grounds:

Polymer Tempera Gesso Recipe

| | |
|---|---|
| Polymer Tempera Medium | 4 parts by volume |
| Titanium White | 5 parts by volume |
| Whiting | 5 parts by volume |
| Lithopone | 5 parts by volume |
| Water | 10 parts by volume |
| Polymer Tempera Retarder | 1 part by volume |

(The retarder may be omitted but it will assist in the brushing out qualities.)

Mix Polymer Tempera Medium, water, and Retarder. Mix the dry ingredients and sift into the liquid, adding a little at a time and stirring thoroughly before adding more. When all the dry mix has been added, stir gently to avoid creating

Polyme

bubbles. Strain through a wire screen. Dilute with water to the desired consistency. Stir occasionally to prevent setting.

Inert powders or aggregates such as pumice, sand, ground glue, et cetera, may be mixed with gesso to provide a textured surface for drawing, painting, or pastel painting.[23]

Gesso

Polymer Tempera Gesso on Masonite

After the board has been sanded, size it with a solution of one part medium to two parts water. When this coat has dried thoroughly (about 20 minutes) apply a second coat. When this is dry apply the Polymer Tempera Gesso. Unlike some gesso, there is no danger of cracking or shrinking during the curing process.

Polymer Tempera Gesso on Canvas

Use the procedure recommended for masonite board.

Monotypes

> Since Polymera Tempera Retarder is a water-soluble resin solution, it is particularly suitable for one monotype process, the transferring of a nonabsorbent surface to an absorbent one. Since it is a remoisturable adhesive, there is no need for the great haste required with other monotype media. Before making the transfer, size the paper with a solution of Polymer Tempera, colored or clear, and before it has set, transfer the print by using pressure. During hot weather, alter the sizing mixture with more water and retarder because of the increased rate of evaporation.[24]

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[23] Ibid., p. 5.

[24] Polymer Tempera Handbook Supplement (Somerville, Mass: Polymer Tempera, Inc., 1956), p. 6.

# CHAPTER VI

## TESTS OF MATERIALS

Experiments and illustrations presented as a unit to support the hypothesis that the Polymer Tempera materials explored do enrich art experiences. After experimenting with the materials explored in this thesis, the writer was confident of their worth as a definite aid to art expression. As a result of that conviction the body of this work was offered as actual proof of that belief.

The proof is set forth in a series of experiments whose execution procedures have been described and evaluated, step by step: (1) materials, (2) procedures, and (3) advantages.

These experiments have been illustrated by the writer; then photographed by Kieth Hall of the Audio-Visual Department of Indiana State Teachers College, and presented as documentary proof of procedures.

Such experiments were developed by the use of Polymer Tempera Medium and its associate materials, Polymera Retarder and Polymera Clay Powder, in such combinations with established media as was felt necessary to help establish the true worth of the Polymer Tempera unit of materials as a definite aid in the enrichment of art expression in the areas of painting, sculpture, transparencies, and crafts. The writer also presented a summation of the results of the experiments, stressing

certain advantages found in the experiments.

In the area of painting. Polymer Tempera Medium and its associate materials, Polymera Retarder and Polymera Clay Powder, in combination with the following media:

1. Tube water color (transparent).
2. Tempera paint--dry.
3. Tempera paint--moist.
4. Oil painting (casein over painting).
5. Casein (buttermilk base).
6. Water soluble dye.
7. Chalk (pastel--dry).
8. Chalk (pastel--wet in wet).
9. Inert aggregates added to paint media included:
   a. Sand.
   b. Sawdust.
   c. Shavings (wood).
   d. Hemp rope (bits).
   e. Textured cloth.
   f. Yarn.
   g. String.
   h. Talcum.
   i. Ground glue.

Elmer's Glue was used in the writer's formula for gesso.

In the area of sculpture (including collage and craft projects). Aggregates and other products added to the Polymer Tempera unit of materials included:

| | | |
|---|---|---|
| Sawdust. | Vermiculite. | Yarn. |
| Sand. | Plaster. | String. |

| | | |
|---|---|---|
| Pebbles. | Glass (straight and bent). | Paper toweling. |
| Rocks. | Three-ply cardboard. | Paper towel core. |
| Shavings (wood). | Whiting. | Reed. |
| Hemp rope. | Pumice dust. | |

Transparent painted (paper) nuts.

Elmer's Glue was used where an instant adhesive was desired.

In the area of transparencies, the media used in combination with the Polymer Tempera unit of materials included:

a. Water soluble dye (Transparent).

b. Transparent ink (India).

c. Transparent water color (school-box style).

d. Tempera.

e. Casein.

f. Plastacine for retaining walls.

g. Glass, saran wrap, plastic (used as supports for setting transparencies).

h. Painted bits of tracing paper.

The quantity and cost of materials, in the Polymer Tempera unit of supplies, consummed in the realization of the experiments presented:

| | |
|---|---|
| 1 gallon Polymer Tempera Medium | $12.00, less 20% |
| 8 oz. of Retarder | 1.00, less 20% |
| 8 oz. of Clay Powder | .50, less 20% |

When the price of $12.00 per gallon (the cost of Polymer

Tempera Medium) was first considered it may have seemed prohibitive, but upon comparing it with the price of shellac, it seemed less so. When one further considered it, as in most cases, diluted to one part P.T.M. to three parts water or paint, it became still less expensive to use. Then the brushes and containers involved in any art process could be cleaned with water and soap. As a result of all these things, the use of the unit involved was very inexpensive.

Experiments and evaluations. The experiments and evaluations presented support the premise that Polymer Tempera Medium and its associate materials, Polymera Retarder and Polymera Clay Powder, can and have enriched art expression, when used in combination with established Media and materials known to be water soluable, both at the public school and adult levels.

Figure 1. Tulip Time, Still Life, 26" x 21½" Water color (transparent and opaque)

Problem: Restoration of an old water color.

Materials: The flowers, vase, book, candle and candle snuffers were painted on two hundred pound semi-porous Grumbacher hand-made paper, then placed in the file of unfinished paintings, Grumbacher casein in combination with Polymer Tempera Medium ¼ P.T.M. to the volume of paint. No. 20 round sable and ½" and 1" bristle brushes were used.

Procedure: The front and back side of the study were saturated with P.T.M. Size, 1 part P.T.M. to 3 parts water, laid on a piece of brown wrapping paper and allowed to dry (about ½ hour). The water-color paper became adhesive to the wrapping paper, strengthening the support. The size was applied with the palm of the hand moving the puddle of size from the center of the study outward. The painting was then finished with casein and given two coats of size with drying periods between applications.

The advantages: Changes could be made in the composition; the candle in the background was painted out, the background, and foreground were added and high lights accentuated the original units of the study.

FIGURE 1

TULIP TIME, STILL LIFE, TRANSPARENT AND OPAQUE WATER COLOR

Figure 2. Afternoon in the Park, Landscape Casein over oil on canvas, 14" x 18"

Problem: Opacity--combination of casein over an oil painting--a turpentine oil sketch on stretched canvas.

Materials: 1. Casein paint in combination of ¼ Polymer Tempera Medium to the volume of pigment plus 1/10 part Polymer Retarder and Polymer Clay Powder to build the pigment mixture to a thick pasty bulk.

2. Oil brushes (bristle).

Procedure: The oil sketch on canvas was cleaned off with fine sandpaper, dusted and wiped with a clean damp cloth. A Polymer Tempera size (1 part P.T.M. to 3 parts water) was then applied to the oil painted canvas surface. After a short drying period (about 20 minutes) casein paint in the form indicated above was painted over the sized oil sketch to pick up modulation and contrast in color. After a short drying period, another coat of size was applied over all, resulting in a very satisfactory effect.

The advantages: The oil sketch had been thrown back in a stack of paintings unfinished. The painter did not have the impulse to get out a mess of oil paints on a hot summer day, but the procedure outlined above worked, giving promise of a better end for other oil sketches that have never somehow been completed.

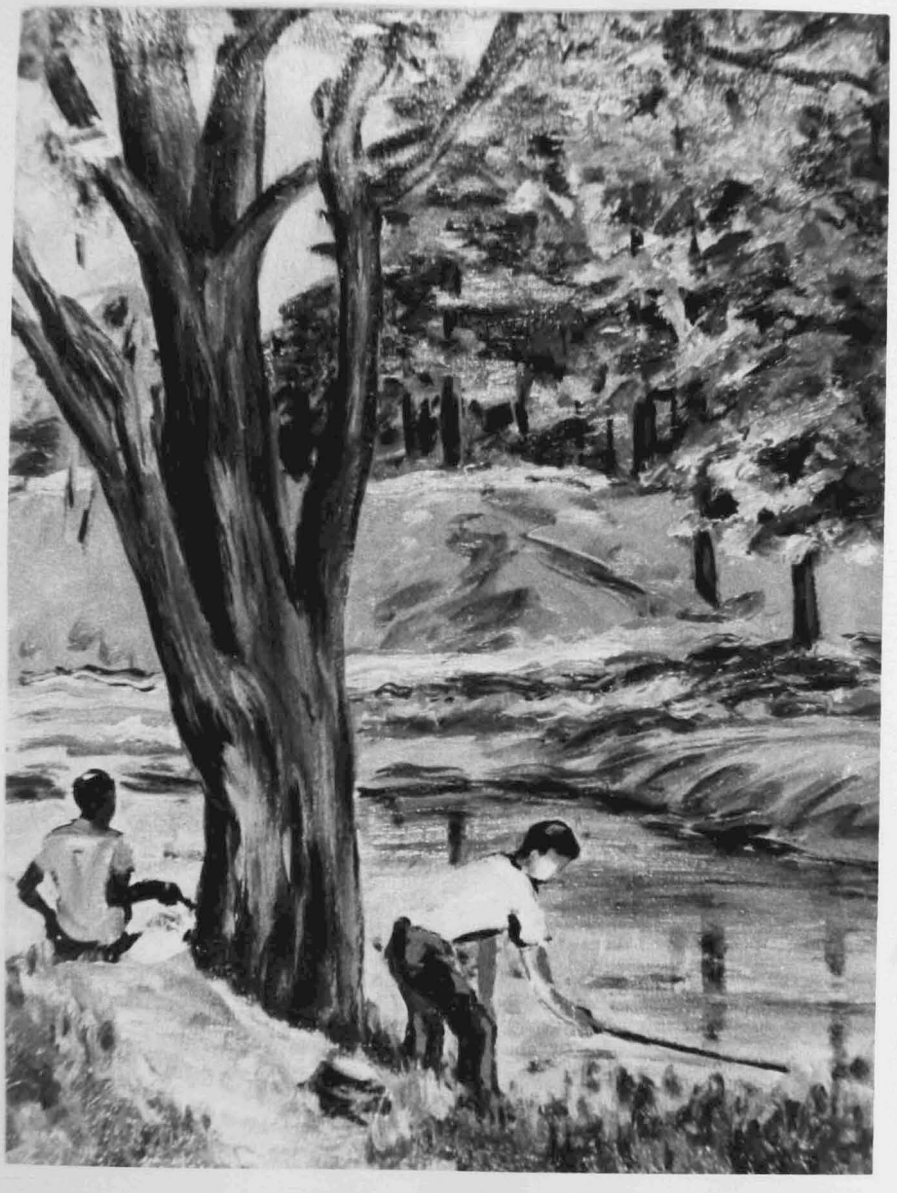


FIGURE 2

AFTERNOON IN THE PARK, LANDSCAPE
CASEIN OVER OIL ON CANVAS

Figure 3. The Clown, Still Life; Opaque and transparent Casein (applied with sponges) 25" x 21"

Problem: Pointal and wash method of using casein paint.

Materials: (1) casein paint mixed with Polymer Tempera Medium in the ratio of ¼ P.T.M. to the volume of paint, (2) 140 pound Fabliano handmade water color paper stretched, (3) 1½" squares x ½" thick celulose sponges (one for each color used in the experiment), (4) two open bowls, to wash sponges and moisten paint, (5) palette (plastic ice cube tray) with paints premixed with P.T.M., and (6) color series unit--full intensity of pigment accompanied by the tints of the colors set up for the study.

Procedure: A corner of one of the sponges was used to lay in a pale drawing with yellow paint (transparent) solution. Washes of dark were played over the format to establish design, warm and cool. Light and dark transparent and opaque color was then applied with the sponges to create harmony and contrast in arriving at a pleasing composition. The advantages of the Polymer Tempera System in evolving the technique used as a basis of experiment in Figure 3 were that the opaque masses dried quickly, making it possible to apply wet washes over them using the direct approach necessitated by this semi-hard type of sponge. By the varied use of the sponges, a variety of tactile and visual textures were attained, resulting in a clear, fresh interpreta-

tion of the subject, illustrating the use of the pointal and wash system of color application.

FIGURE 3

THE CLOWN, STILL LIFE, OPAQUE AND TRANSPARENT CASEIN

Figure 4. The Court of Two Sisters, Landscape with figures Wash and line (Transparent casein) Illustrated in two stages. 19" x 24"

Problem: Line drawing over a puddled color washes.

Materials: Casein (transparent) with opaque outline. (1) casein paint mixed with Polymer Tempera Medium in ratio of ¼ P.T.M. to the volume of paint, and (2) 140 pound Fabriano water color paper (double elephant)--stretched.

Procedure: Stage 1. After the paper was stretched and drummed out it was saturated with water applied by using a large kitchen sponge: color was dropped on the moist surface suggesting shapes as previously indicated by a light pencil layout of the composition. A kleenex was then used to pick up a soft pattern of light around the area planned as the center of interest. After the surface dried and drummed out again, small areas were dampened and snap bits of color were again allowed to fray out over the moistened areas of paper. The surface was again allowed to dry.

Stage 2. After the paper drummed out the third time--bone dry--dark outline picked up the composition by playing in and out of the forms suggested in the puddled washes creating a gayety, mystery, and delicate beauty that resulted in a bit of "old" New Orleans.

Advantages: Absence of muddiness when applying a wet wash over a wet wash that had dried, and interesting line definition of form.

Stage One

Stage Two

FIGURE 4

THE COURT OF TWO SISTERS, LANDSCAPE WITH FIGURES, TRANSPARENT CASEIN. PROCEDURE ILLUSTRATED IN TWO STAGES

Figure 5. Fish Market, Landscape with Figures, Water color (transparent) Developed in three stages of procedure. 25" x 19"

Problem: Transparent water color working from wet wash to textured areas with dry brush, finishing with modified outline.

Materials: Tube water color (transparent) 1/6 P.T.M. to volume of paint--Glass egg plate used as palette; 140 pound Fabriano water color paper. (Double elephant stretched on large drawing board, made secure with thumb tacks) No. 20 Round Sable-oil bristle brushes. No. 2 Round Sable for outline.

Procedure: Paper was immersed in water then thumb tacked to a wood drawing board. After the paper dried, a composition was arranged (with charcoal) from an on the spot color slatch made on location near New Orleans.

Stage 1. The paper was dampened with water by using a large household sponge. The sky was floated in with yellow ochre, burnt umber, ultramarine blue and cerlean blue with a touch of alizam crimson near the horizon. The background trees were then floated in, using thalo blue, cerulean blue, alizam crimson, paynes gray, and cadmium yellow medium. The foreground was then floated in with the same colors used in the sky--but the value is a little darker and the hues stronger since the surface is slightly dryer.

To adjust color tone, texture, light and dark strokes were laid in with a flat bristle brush, since the paper is semi-dry at this stage. Sharpness of some edges were brought out. Color is left open so additional hues found in the sky can be floated into the semi-dry texture to pull value areas together.

Stage 2. The water area was again washed over with water, then the colors of the sky were echoed on the water's surface--a little more intense in hue and darker in value than the colors in the sky but not as sharp as the colors in the run way. The ground areas were then laid in with the same colors used in the sky but dryer. The side walls of the fish market were laid in with a broken wash of cadmium, red light paler on the light side, with cadmium yellow medium dropped into it, together with a touch of cerulean blue, while on the shaded side alizam crimson and cerulean blue were dropped into the darker body wash of cadmium red light. The telephone poles were laid in with cadmium red light washed into with burned umber and ultramarine blue. More cool color was floated on as the poles moved into the distance. The colors for the figures were laid on with the side of a No. 12 round sable brush. The original palette was repeated, color dryer and edges more crisp with stronger contrasts.

Stage 3. The flat bristle brushes were used to texture and

define the wood in the planks of the runway, the piling and telephone posts, fish market and plant in the foreground, while the No. 12 round Sable was used to accent the water, the figures and the ground areas. The suggestive outline was applied with a No. 8 red sable round.

Advantages: When Polymer Tempera Medium is in combination water color paint pigment and applied in the usual manner, it has the advantage of being resistant to moisture without taking on a surface shine. However, if a surface gloss is desired, a coat of Polymer size can be applied over the finished water color.

Stage One

Stage Two


Stage Three

FIGURE 5

FISH MARKET, LANDSCAPE WITH FIGURES, WATER COLOR, DEVELOPED IN THREE STAGES OF PROCEDURE

Figure 6. The Cheer Leader: Portrait of a Clown. Transparent water color and casein (opaque) 18" x 24"

Problem: Opaque portrait from a ceramic sculpture modeled and fired by the painter.

Materials: Wallboard support, crinoline ground, made adhesive to wallboard by sinking crinoline into gesso, casein paint, with Polymer Tempera Medium ¼ to the volume of paint, with extender and clay powder added as indicated above, transparent water color, and bristle brushes.

Procedure: Both sides of the wallboard were saturated with P.T.M. size 1 part P.T.M. to 3 parts water. The crinoline was coated on both sides with the size and laid on the freshly saturated wallboard. When dry the crinoline is made fast to the wallboard, and a coat of gesso was applied over all.

Polymera tempera gesso used in this experiment:

| | | |
|---|---|---|
| Polymer Tempera Medium | 4 parts of volume) | |
| Elmers Glue | 3 parts of volume) | |
| Whiting | 4 parts of volume) | Writer's |
| Dry white tempera paint | 3 parts of volume) | formula |
| Ground glue (rabbits) | 1 part of volume ) | for |
| Polymera Retarder | 1 part of volume ) | gesso. |
| Polymera Clay Powder | 1 part of volume ) | |
| Water | 8 parts of volume) | |

After the gesso was dry (1½ hours) the support was placed on the easel, then the underpainting was done with washes of transparent water color, and built up with a strong accented line. The portrait was then finished with casein paint in combination with Polymer Tempera Medium ¼ part

P.T.M. to volume of paint. When dry it was given three coats of P.T.M. size--1 part P.T.M. to 3 parts water. The advantages: The particles of ground glue lodged on the surface of the crinoline and between the wallboard and the crinoline forming a screen-like textured surface attained by the particles of glue pulling both the paint and brush, thereby forming pleasant contact between the painting media and the supporting ground. The finished painting was given three coats of P.T.M. size indicated above.

FIGURE 6

THE CHEER LEADER, PORTRAIT OF A CLOWN,
CASEIN, (OPAQUE)

Figure 7. The Water Hole. Tempera on textured material mounted on five-ply wood veneer. 13" x 17"

Problem: The composition was inspired by an eighth-grade art student's crayon drawing made to the rhythm of a tune hummed by the student. The writer, painter, worked out the composition presented from the student's sketch which was made under her direction as a unit of a class project.

Materials: Moist tempera paint with 1 part P.T.M. to the 3 parts volume of paint with Polymera Clay Powder to build the impasto of the paint. Bristle brushes, 5-ply wood supports with 1/8" square curtain net set in Grumbacker commercial gesso, with Polymer Tempera Medium and water added to the commercial gesso.

Procedure: The wood support was given a coat of P.T.M. size--1 part P.T.M. to 3 parts water, allowed to dry and then the gesso mixture was spread over the wood surface; while still wet the curtain net was sunk into the gesso ground, allowed to dry. A charcoal sketch was made. Then the Polymer Tempera changed tempera was laid in flat areas. After the areas were related in color and value relation, a dark outline was applied around each area. The areas were then accented with light and shade.

Advantages: 5-ply wood will not warp, the cloisens of the curtain net hold the paint and create tactile and visual surface texture.

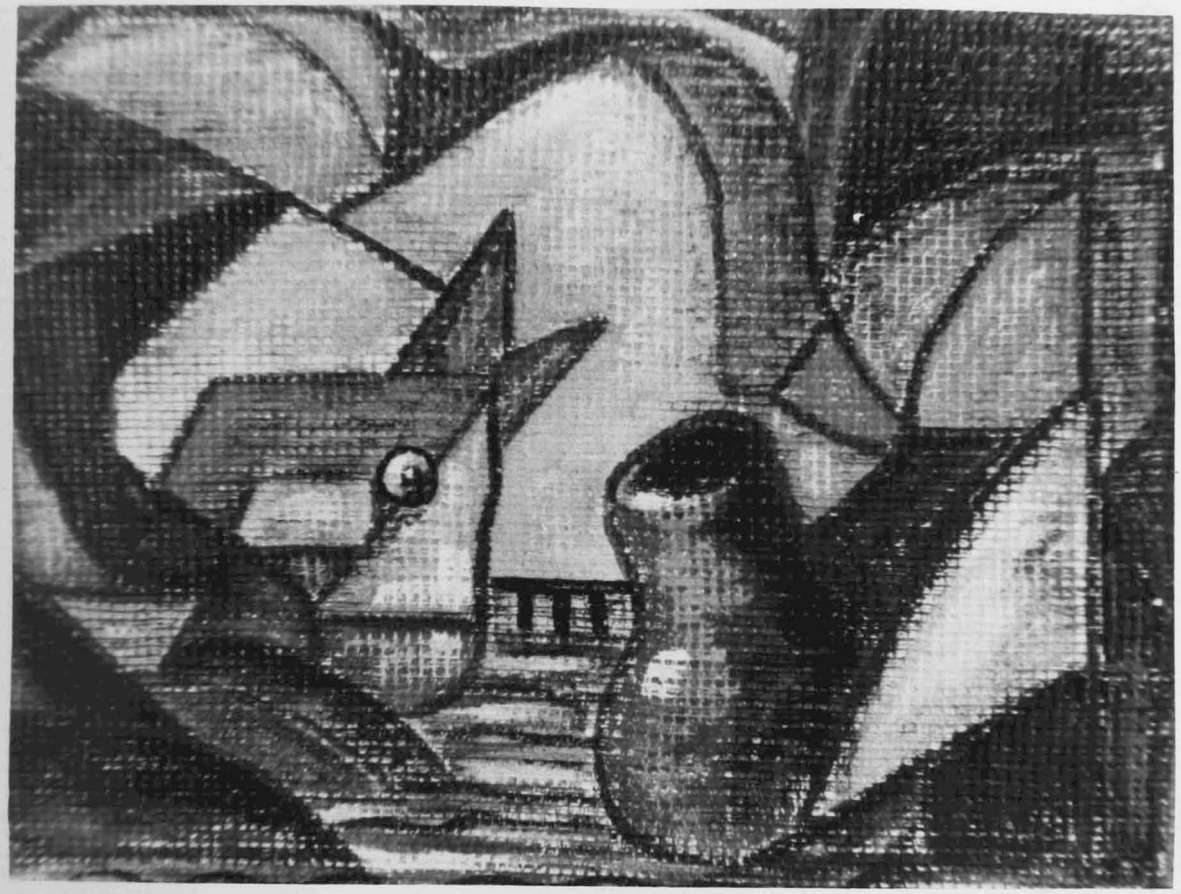


FIGURE 7

THE WATER HOLE, TEMPERA ON TEXTURED MATERIAL MOUNTED ON FIVE-PLY WOOD VENEER

Figure 8. The Handmaidens. Chalk and tempera on textured gesso panel mounted on masonite board. 17" x 40"

**Problem:** Elongation and compression, chalk puddled with Polymer Tempera Medium to form a chalk pigment solid sunk in the cloisens of curtain net and gesso, finished with tempera in ¼ P.T.M. to the volume of tempera paint.

Materials: The Handmaidens and the Warriors, Figure 9, were inspired by characters found in a mural made by a fourth grade room at Rankin School, Terre Haute, Indiana; classroom teacher, Miss Gertrude McCormick, in collaboration with art consultant, Mabel Mikel Williams. The curtain net was set in gesso on masonite board support as Figure 7.

Procedure: After setting the curtain net as indicated above, a charcoal sketch was made and sprayed with P.T.M. size, 1 part P.T.M. to 3 parts water. After a short drying period, the value and color relations were tentatively placed by using chalk; continuing with chalk, it was carried to a point of near completion. The support, laid flat, was then saturated with Polymer size by puddling it into the chalk and cloisens formed by the net. The size was dispersed with a 3" enamel brush. This set up a type of blended paint surface. The chalk dust was changed to the consistency of opaque paint, Tempera paint with Polymer solution ¼ of the volume of paint. A partial outline was

then applied. After a short drying period, three coats of Polymer Tempera size were painted over the surface giving the composition great depth.

The advantages: The deep cloissens created by the curtain net, the tooth created by the particles of glue, and the body made possible by the gesso bed--all help to hold the chalk dust. And because the ground had been treated with P.T.M. when the P.T.M. size was puddled into the chalk painting, the whole unit formed a perfect bond.

FIGURE 8

THE HANDMAIDENS, CHALK AND TEMPERA ON TEXTURED GESSO PANEL, MOUNTED ON MASONITE BOARD

Figure 9. The Warriors. Gesso surfaced. Panel mounted on masonite board. 17" x 40"

Problem: The same as Figure 8.

Material: The same as Figure 8.

Procedure: The same as Figure 8.

Advantages: The same as Figure 8.

FIGURE 9

THE WARRIORS, GESSO SURFACED, MOUNTED ON MASONITE BOARD

Figure 10. A New Face. Still Life. Chalk on brown wrapping paper, 13½" x 21"

Problem: To find an inexpensive support that can be used for on-the-spot sketches as well as a surface easily attained for work with chalk at the public school level.

Materials: Brown wrapping paper, chalk (school type round) used in the same way professionals use pastel--Polymer Tempera Medium size--1 part P.T.M. to 3 parts water, small spray gun.

Procedure: The paper was treated with P.T.M. size on both sides, applied with 3" enamel brush. It was then laid down on newspaper and allowed to dry. During the drying period the surface was smoothed out at intervals insuring a binding between the brown wrapping paper and newspaper, thereby making the brown paper support stronger. While the surface of the paper is wet, sawdust, sand, talc, whiting or other fine aggregates could be sprinkled on the surface if a different texture is desired. A charcoal study was first laid on the dry surface; then it was sprayed with the size. After a drying period, the chalk painting was superimposed over the charcoal study, then sprayed again.

Advantages: The paper is made stronger. The surface is more compatible with charcoal or chalk. The finished piece is more permanent.

FIGURE 10

A NEW FACE, STILL LIFE, CHALK ON
BROWN WRAPPING PAPER

Figure 11. Ozark Hideout. Chalk on white water color paper, 19" x 22"

Problem: Wet in wet chalk technique over a transparent water color value painting.

Materials: 140 pound Fabriano water color paper, stretched water color under painting, chalk and Polymer Tempera size.

Procedure: Water color paper stretched and drummed out; a value painting in transparent water color, keyed low in the value scale, close in color harmony, and quite neutral in tone. After a drying period, the paper was removed from the stretcher, sprayed with P.T.M. size, 1 part P.T.M. to 3 parts water on both front and back sides of the paper, laid down on a piece of newspaper and allowed to dry. The study was then overpainted with a thin application of chalk and sprayed again and given a short drying time. Then each area of the composition was built up, areas were then painted with a thin coat of size, another container of size was within easy reach of the artist. Into this solution the chalk was moistened before it was applied; the wet area being painted upon the completed study was given two coats of size with drying time between spray applications.

Advantages: The rough water color paper gives tooth to the surface; the underpainting makes a tinted ground; the size toughens the paper; surfacing size adds permanency.

FIGURE 11

OZARK HIDEOUT, CHALK ON WHITE WATER COLOR PAPER

Figure 12. Space and Many Faces. Tempera outline over underpainting on gesso. Wallboard support, 18" x 24"

Problem: To create rhythm stemming from the subconscious by thinking of forms, faces, keeping the line continuous from the time the brush is set down on the support until it is withdrawn at the end of the experience in an uninterrupted line drawing.

Materials: Wallboard, tempera paint, No. 12 round sable brush, gesso, ground glue and P.T.M. size.

Procedure: The wallboard sized on both sides with P.T.M. size, 1 part P.T.M. to 3 parts of water. The writer's formula for gesso was applied to surface. When dry, the surface was painted in pastel tones in related forms of rectangular shapes using tempera paint. After the above underpainting was finished a coat of size was applied with a large brush. (The tempera having been charged with size) made a secure bond between board, painting and surface coat. When dry, black tempera paint was charged with ¼ P.T.M. to volume of paint with a large No. 12 round sable brush. The continuous outline was applied resulting in the many faces seen in the illustration. The line was then varied to prevent monotony. The study was given two coats of size.

Advantages: The gesso ground helps to create variety in outline; the pastel underpainting creates variety in muted color; size coats make the study more permanent.

FIGURE 12

SPACE AND MANY FACES, TEMPERA OUTLINE ON GESSO
WITH WALLBOARD SUPPORT

Figure 13. Nonobjective (Painting) Tempera. Sprayed background overpainting in black tempera, 18" x 24"

Problem: Spray method of underpainting through the use of stencil arrangement. Overpainting dull; underpainting gloss finish.

Materials: Wallboard, white tempera paint. Moist tempera colors used in spray gun, black tempera for overpainting. All paint charged with P.T.M.--¼ P.T.M. to the volume of paint.

Procedure: The wallboard was treated with size, 1 part P.T.M. to 3 parts water on both sides. White tempera was then applied to front side. After a short drying period, the surface is sprayed with size. After dried, the stencil design developed by applying colors with a spray gun, forming the underpainting. The P.T.M. charged black paint was then applied over the underpainting. The finished painting was not finished with size as the contrast between gloss and dull was desired.

Advantages: The procedure just described could have resulted in the same design interest with a uniform surface, but it could not have had a contrast between the underpainting and overpainting such as was the result of this experiment. The permanent quality of the result is most advantageous and the fact that all the layers are in perfect bond is also desirable.

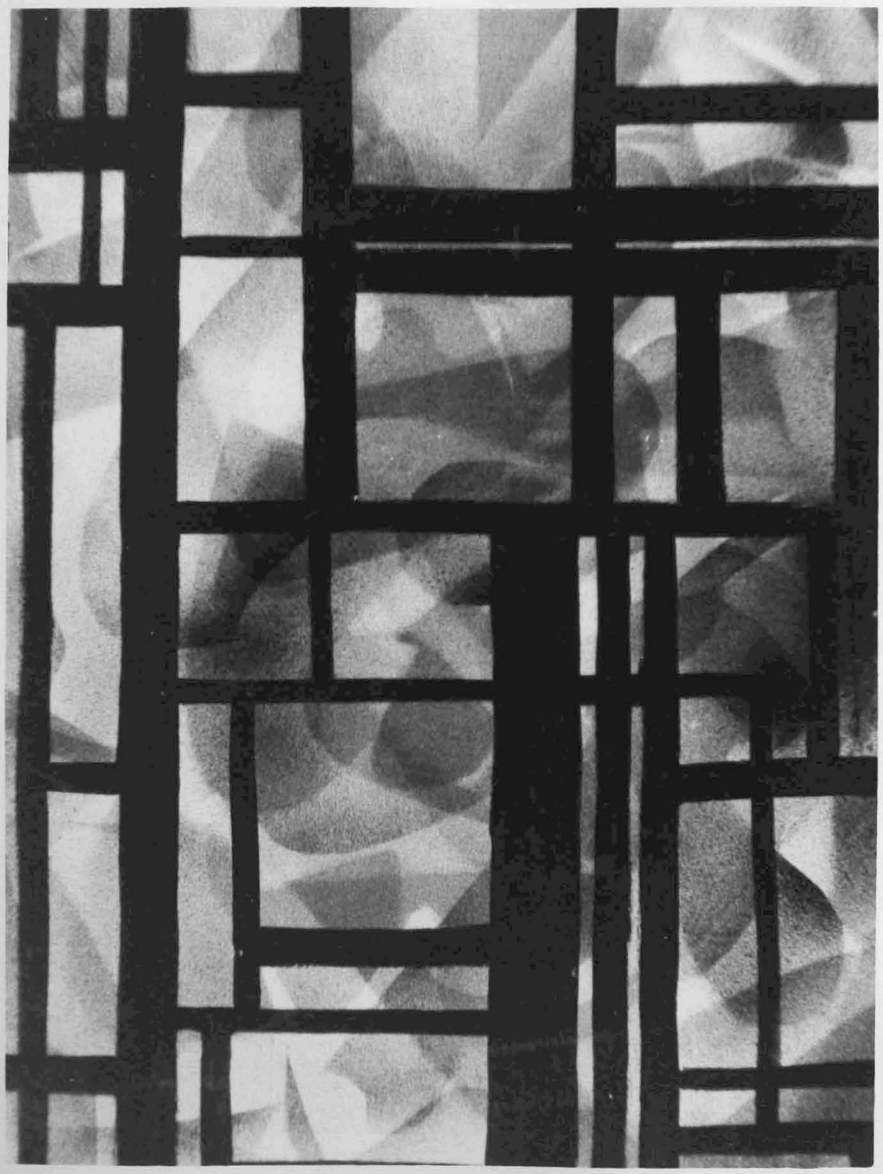


FIGURE 13

NONOBJECTIVE, TEMPERA, SPRAYED BACKGROUND
OVERPAINTING WITH BLACK TEMPERA

Figure 14. Collage. Nonobjective. 13½" x 17"

Problem: To ascertain the binding qualities of Polymer Medium with heavier and varied aggregates.

Materials: Canvas made adhesive to 5-ply wood support with P.T.M. size, 1 part P.T.M. to 3 parts water. Yarn, sawdust, shavings, sticks, pebbles, rocks as large as 1" in diameter, pink jewelry, glass, string and embroidery floss.

Procedure: Fine sawdust was sprinkled over the wet surface, sprayed, with heavy shavings dispersed on the surface, then sprayed with the size charged with pink tempera, and oversprayed with a soft violet size. The yarn was dipped in size, laid on the format forming layout units of the composition. The composition was then finished by using the aggregates listed above. Polymer Tempera Medium (full strength) was used to glue all aggregates in position.

Advantages: It was found that P.T.M. could be used both as size, finish, and binder. And the units well placed were permanently put when dry.

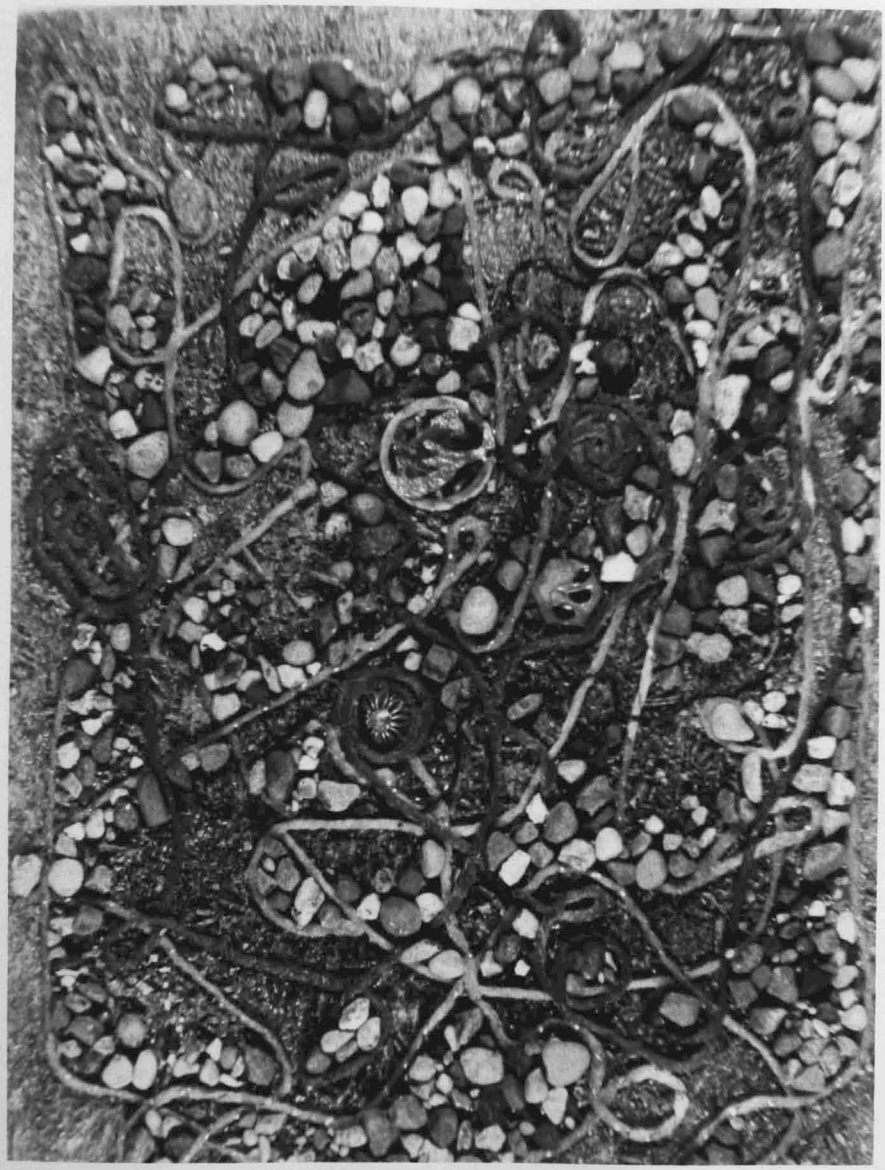


FIGURE 14

COLLAGE, NONOBJECTIVE NUMBER 1

Figure 15. Collage. Nonobjective. 18½" x 10"

Problem: To experiment with plastic mixture involving sawdust, talcum, and P.T.M. on a support of masonite board as a base for certain aggregates.

Materials: Masonite board, sawdust, wood shavings, talcum, sand, cord, hemp rope, string, heavy pieces of glass, metal, plastic, Polymer Tempera Medium, tempera paint.

Procedure: The masonite board was charged with P.T.M. size--1 part P.T.M. to 3 parts water. A plastic pulp was made by using sawdust, a sprinkle of sand, and talcum mixed with Polymer Tempera Medium to form a pulpy paste. This was applied to the masonite support which had previously been sized. The pulp was applied with the hand. It was sprinkled with fine sawdust and shavings which insured a rough unglazed surface. Size treated string, rope, and floss was then placed on the support. The heavier aggregates were then placed and made secure by the use of P.T.M. full strength. P.T.M. charged tempera suggested color scheme keyed to glass units on string and in the background.

Advantages: The pulp body is easily built up on the support. Aggregates can be pushed into the pulp surface while still moist.

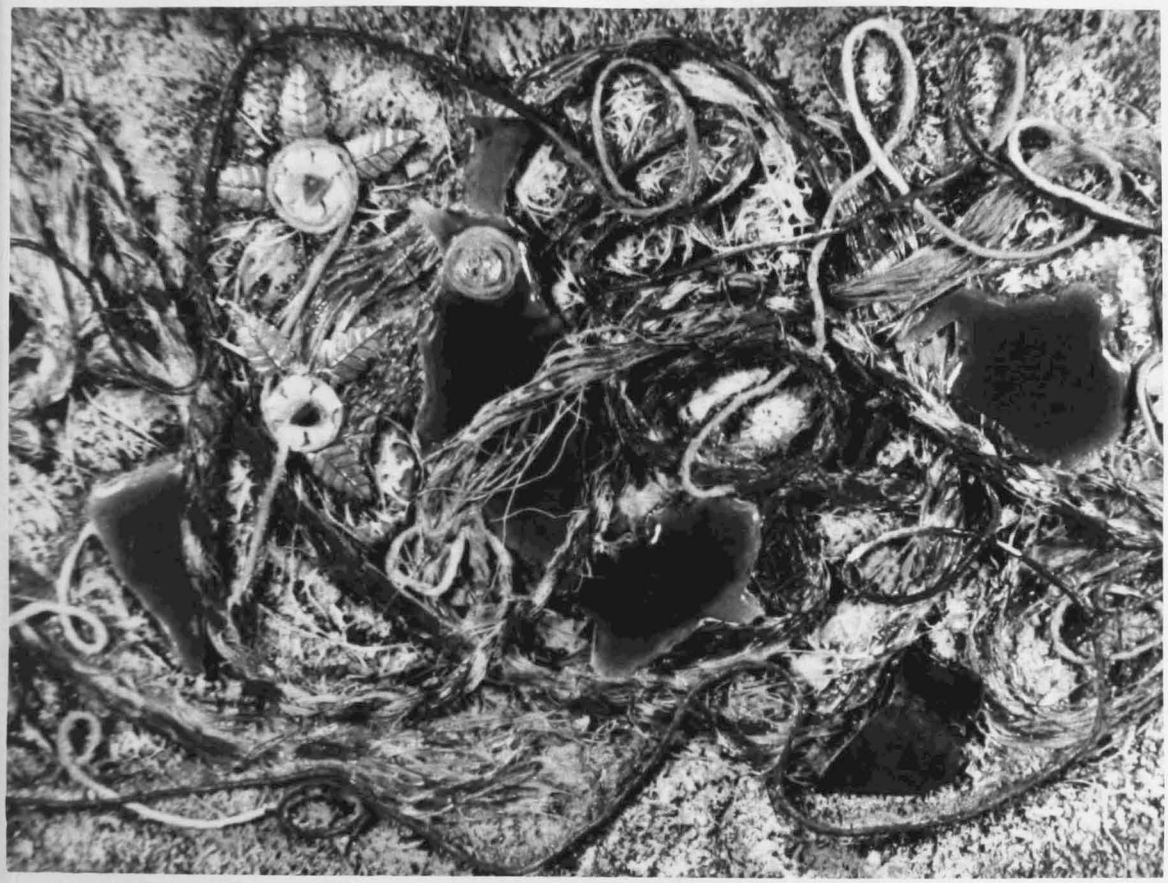


FIGURE 15

COLLAGE, NONOBJECTIVE NUMBER 2

Figure 16. Collage. Nonobjective. 16" x 20"

Problem: To find the strength of 1-3 size P.T.M. in making yarn adhesive to tempera treated burlap (paint and burlap having both been charged with Polymer Tempera Medium).

Materials: 3-ply cardboard support, burlap surface, yarn in white, gray, black and red and Polymer Tempera Medium size, and brown tempera paint (moist).

Procedure: Both sides of the cardboard were treated with P.T.M. size. The burlap was sized on one side and laid on the wet cardboard. The top side of the burlap was then sized. When dry, the surface was painted with P.T.M. size charged with brown tempera paint. When dry the surface was again painted with size. After a short drying period, each color of yarn was immersed in P.T.M. size and arranged in compositional formation on the painted sized surface of the burlap ground.

Advantages: Materials inexpensive and easy to come by. Burlap was part of a vegetable sack. The cardboard was the side of a box. The yarn was odds and ends. After the painted burlap was sized and dry, it did not force color into the yarn that was applied later. Once the yarn was placed, it did not have to be lifted and glued. Upon drying it was permanently secured to the support.

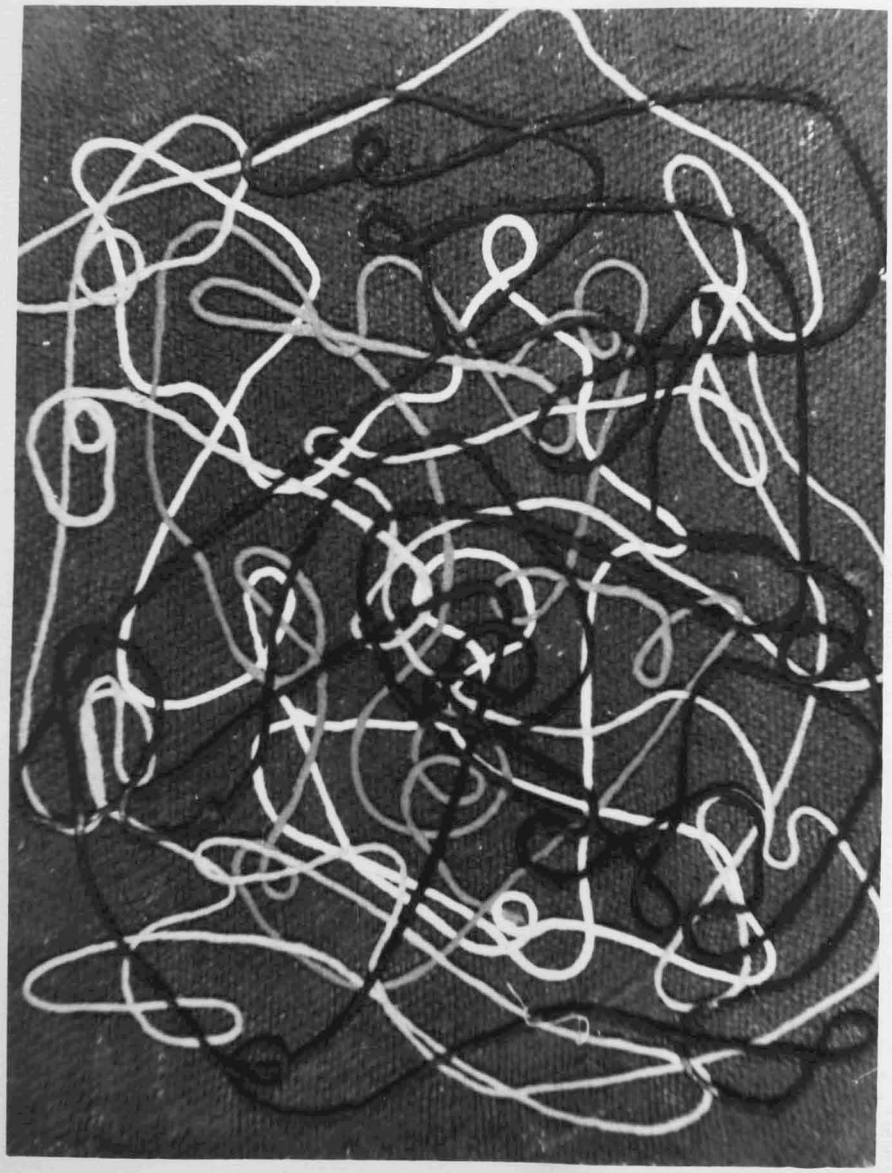


FIGURE 16

COLLAGE, NONOBJECTIVE NUMBER 3

Figure 17. Line and Dimension. Sraffito and water soluble dye on gesso. 16" x 20"

Problem: Dye film spray on gesso ground commercial canvas board support.

Material: 16" x 20" white commercial canvas board. Gesso formula by writer, with ground glue added, water soluble dye, and Polymer Tempera Medium.

Procedure: P.T.M. size was applied to both sides of canvas board; the gesso was then applied to the canvas surface. While still wet, a line movement was pressed into the wet gesso surface through to the canvas surface. When dry the surface was sized, then the design sprayed on with dye in combination with P.T.M. size--2 parts P.T.M. and 2 parts dye concentrate. The outline and design were accented with dye in P.T.M. solution; dye was applied with a brush. Two coats of P.T.M. size was then applied.

Advantages: Here again contrast in texture was achieved. The sprayed dye resulted in a soft drippiness in texture as against the hardness of line. Variety in line was a result of color and value modification. Dimension was created by accenting the rectangular formations suggested by the stencil spray process. All, again, was made permanent with Polymer Tempera Medium size over the finished composition.

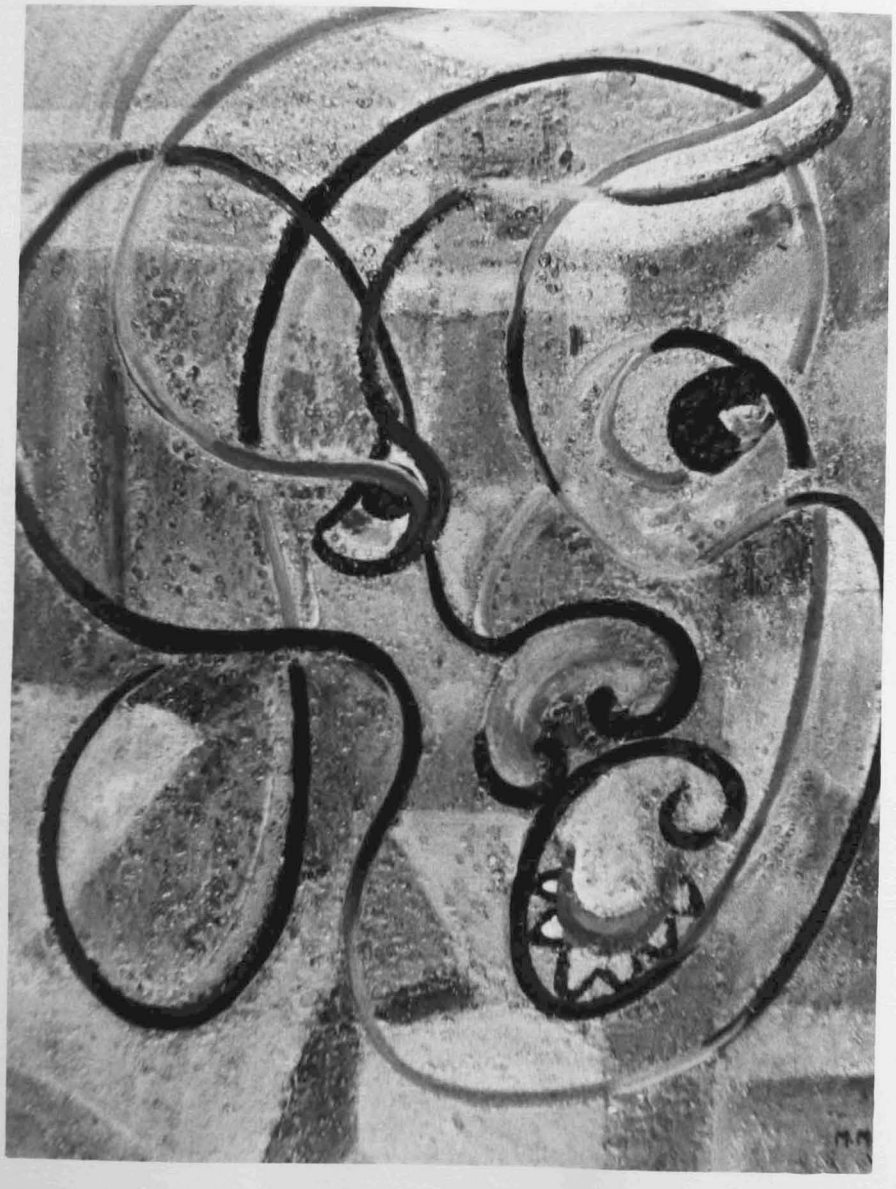


FIGURE 17

LINE AND DIMENSION, SRAFFITO AND WATER SOLUBLE DYE ON GESSO

Figure 18. Mask, Sculpture, Paper Mache'.

Problem: Using newspaper bits in pasty mass modeling in the same manner as when using moist clay.

Procedure: Newspaper was cut in approximately ½" bits. One and one-half gallons of paper bits were soaked for 48 hours. The paper was then squeezed out as needed and mixed with Polymer Tempera Medium, full strength. During the soaking period of the newspapers, a mask base was built up over a wooden mask and plastacine by securing a piece of muslin over the mask built up with plastacine. The muslin was then modelled over with 3" glue faced paper tape. The muslin back was trimmed and sized with P.T.M. to 3 parts water. The paper pulp mixture was then used as clay, building the features in higher relief. The pulp surface was given two coats of size. At this point any type of decoration color or appitures may be added.

Advantages: The modelling experience was much quicker than the strip by strip method of applying paper mache'. Heavy masses dry quickly and are hard as marble when dry yet light weight. With aggregates charged with the medium will be adhesive to the basic sculpture presented in the illustration.

Stage One

Figure 19. Three Heads. Sculpture. Paper mache' over paper towel cores.

Problem: Paper pulp prepared in the same manner as in Figure 18. The problem is to model the heads in full depth with the mache' mixture.

Materials: Paper pulp mixture, paper towel cores. Polymer Tempera Medium full strength, bristle brush.

Procedure: The paper towel core was glazed with Polymer Tempera Medium full strength, making the core hard and durable. The mache' pulp was then modelled around and over the core. When the sculpts were dry, 24 hours drying period, they were then sealed with a coat of P.T.M. full strength, applied with a bristle brush.

Advantages: Quick drying, easy manipulation, no odor, utensils cleansed with water, and all materials used to finish puppets can be made secure by the use of P.T.M. After drying, finished parts are not affected by moisture.

FIGURE 19

THREE HEADS, SCULPTURE, PAPER MACHE'
OVER PAPER TOWEL CORES

Figure 20. The Little Man. Paper mache' over twisted paper armature.

Problem: To find whether or not Polymer Tempera Medium size would harden a twisted paper armature sufficiently to model over.

Materials: Paper mache' pulp as used in previous experiments, paper armature, paper toweling, and yarn.

Procedure: Newspaper was rolled into small tube-like rolls slightly twisted, wrapped with yarn and bent into shape, secured with yarn, and charged with P.T.M. size. The paper pulp was then used to model the head, hands, and feet. The hands, face, and feet were then covered with paper toweling charged with P.T.M. size.

Advantages: The armature was easily shaped, and it was hardened by the P.T.M. size also forming a bond with the paper pulp which was applied to it. On the public school level, it is easier to manipulate the development of paper armature than different types of wire armatures. Many Polymer charged aggregates could be applied to the paper armature presented in this illustration other than paper pulp.

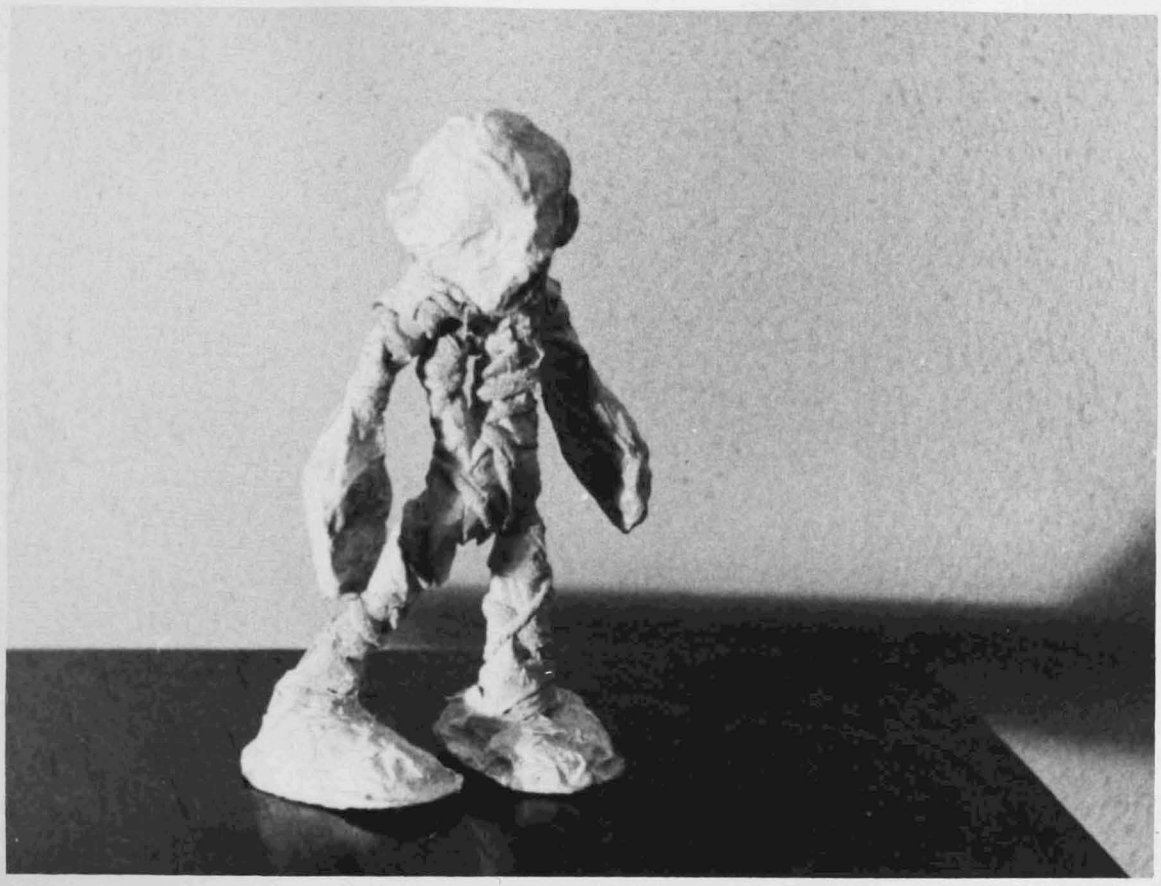


FIGURE 20

THE LITTLE MAN, PAPER MACHE' OVER
TWISTED PAPER ARMATURE

Figure 21. The Gossips. Vermiculite sculpture with aggregates.

Problem: The advantages; the strength of Polymer Tempera Medium as opposed to water alone in mixing formula to be used in bulk carving.

Materials: Basic formula for sculpture bulk: 2 parts vermiculite, 2 parts plaster of Paris, 1 part sand, 1 part fine sawdust, 1 part Polymer Tempera Medium and water as required. Pour into a greased box. Allow to set about 24 hours. Knife, chisels, and mallet.

Procedure: Sculpture bulk was carved with knife, chisels, and mallet. When finished 3 coats of size were applied, dispersed by short drying periods. Size 3 parts P.T.M. to 1 part water tinted with a little blue and tan dye.

Advantages: The sculpture bulk had no tendency to shed (to excess) during the carving procedure. The coats of size sealed the carving, giving it a hard surface--permanent to moisture and dust resistant.

FIGURE 21

THE GOSSIPS, VERMICULITE SCULPTURE WITH AGGREGATES

Figure 22. Birds of a Feather. Cardboard and glass sculpture (holiday table decoration).

Problem: By treatment with Polymer Tempera Medium, the stabilization of a cardboard structure to the point of holding great weight of glass.

Materials: 3-ply cardboard, glass bottles, window glass fused with lump and 80 mesh vitrous enamel, shells, string, sawdust, plaster, white tempera paint, Polymer Tempera Medium, Elmers glue, and cotton.

Procedure: Two 6" circles were cut from the cardboard and glued together with Elmers glue; the center shaft and the large birds were also cut double and glued together. All other parts are single. All units are made to fit into one another. When the cardboard unit was assembled, it was hardened with a P.T.M. size solution, then painted with P.T.M. charged white tempera paint. The unit was then glued to a plaster form having been coated with P.T.M. size and built up with sawdust and P.T.M. mass. It was then painted to match the cardboard unit. The glass, enamel, small mosaic bits were then glued to the cardboard unit. Heavy pieces were glued to cotton and then to the cardboard.

Advantages: Solidity and strength.

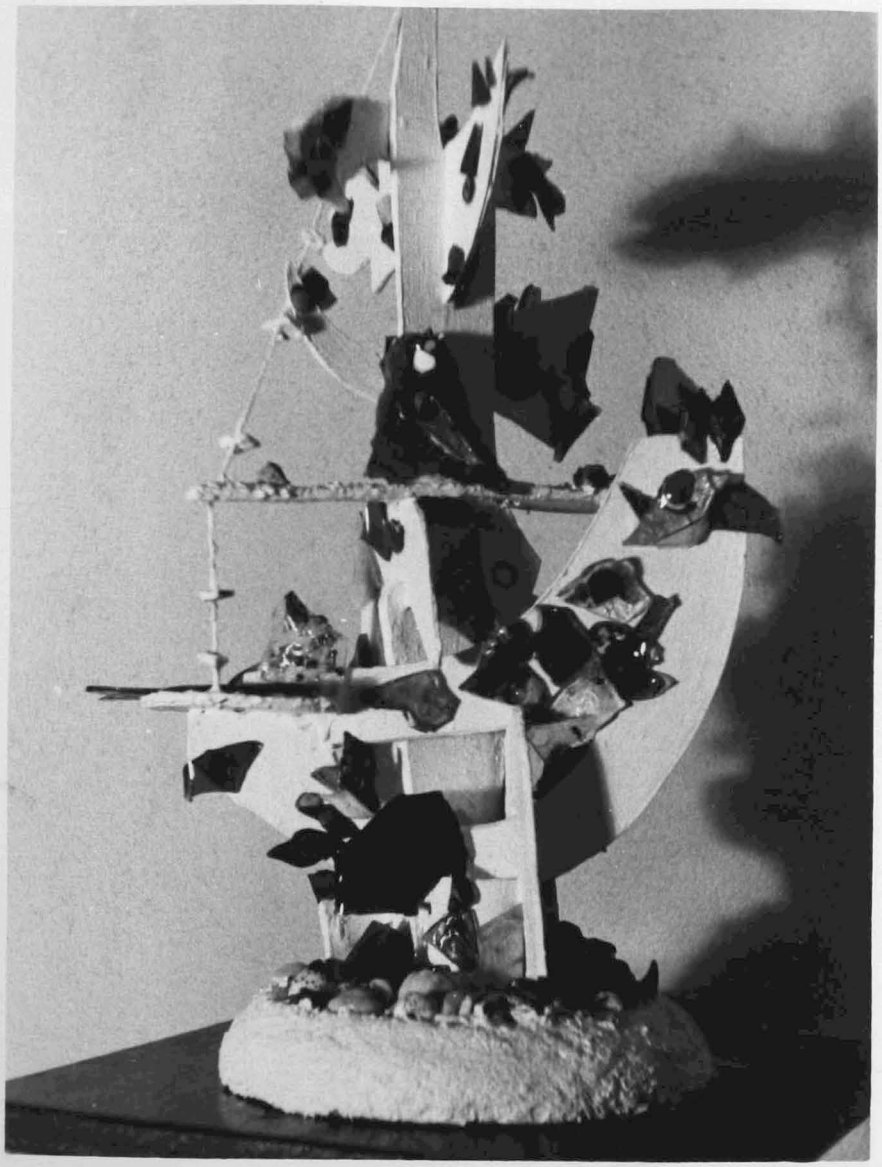


FIGURE 22

BIRDS OF A FEATHER, CARDBOARD AND GLASS SCULPTURE,
(HOLIDAY TABLE DECORATION)

Figure 23. The Humming Bird. Sculpture (Reed and transparent paper).

Problem: To glaze and glue transparencies to reed volumetric sculpture in one procedure.

Materials: Reed, painted tracing paper, masking tape, tempera paint, and Polymer Tempera Medium.

Procedure: The soldering process in the making of reed joints was achieved by the use of connecting with masking tape. After the reed sculpture was finished, it was painted with P.T.M. full strength. The matching pieces of closed units were cut from the painted tracing paper, then charged on the unpainted side with P.T.M.--3 parts P.T.M., 1 part water--as a size, with a flat sable brush, while still wet, it was placed on the reed. Bond was formed between reed and charged paper. After all the parts were thus bound together, the painted side of each paper unit was sized. Units of reed, not covered with the paper, were painted with black tempera paint, charged $\frac{1}{4}$ P.T.M. to the volume of paint.

Advantages: Reed construction was strengthened by coating of P.T.M. The coating gluing process, a time saver, toughened tracing paper to the toughness of fish skin, and enhanced transparency. The coat of black tempera paint was easily applied over masking tape and reed.

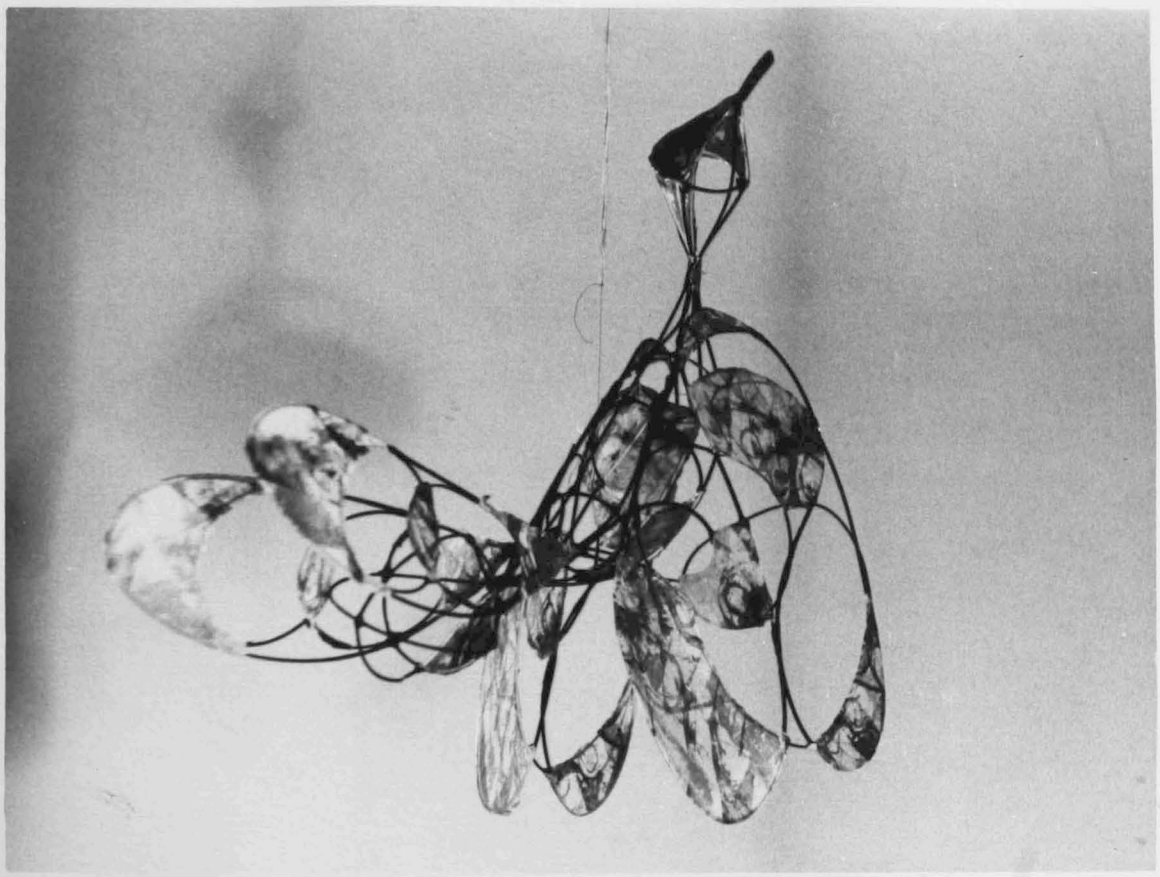


FIGURE 23

THE HUMMING BIRD, SCULPTURE,
(REED AND TRANSPARENT PAPER)

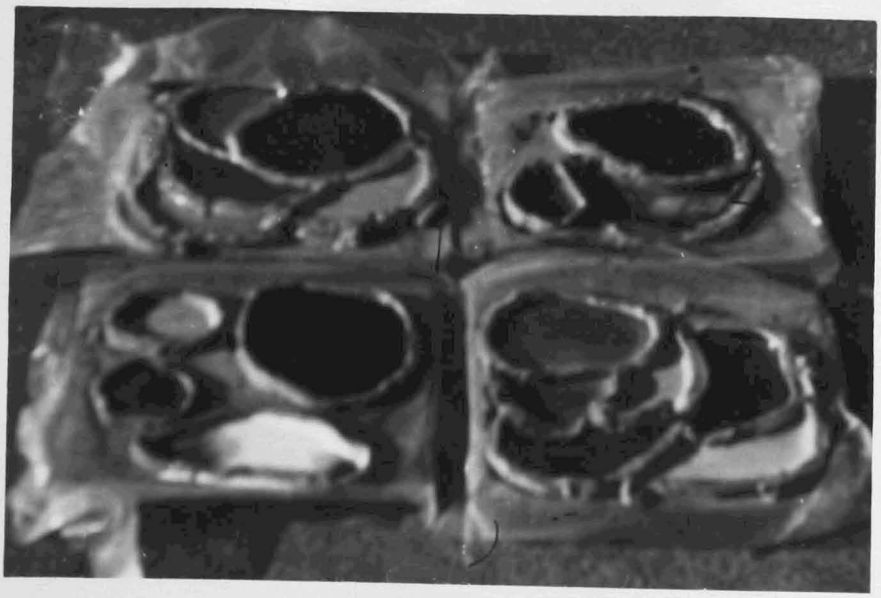
Figure 24. Setting Transparencies.

Problem: Experimenting with color agencies in combination with Polymer Tempera Medium.

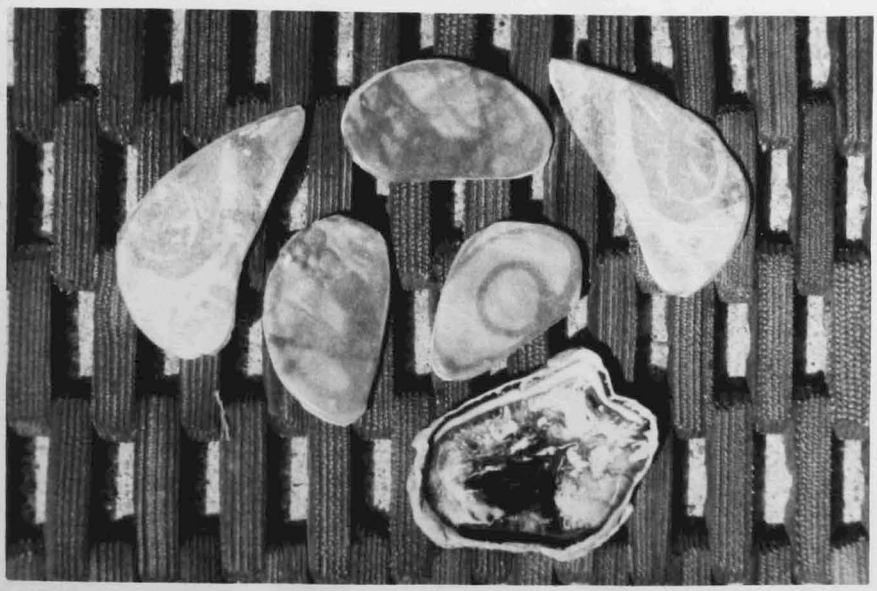
Materials: Plastacine, suran wrap on board, ink, dye, transparent water color, and opaque tempera paint.

Procedure: Suran wrap was placed over boards (smooth). The plastacine walls were then arranged, colors charged with P.T.M. full strength, and poured into walled areas. Painted transparent paper unmounted, and mounted on cardboard were also submerged in P.T.M. full strength, with no color added.

Advantages: Such transparencies can be made in colors desired. They can be cut with school scissors when semi-hard. After they have hardened to a brittle substance, they can be warmed with a light bulb and be cut with scissors. They are light weight and can be glued with P.T.M. with no trace of the bond.



Stage One



Stage Two

Figure 24

SETTING TRANSPARENCIES
ILLUSTRATED IN TWO STAGES

FIGURE 25

SOME OF THE MATERIALS USED IN THE
EXPERIMENTS PRESENTED

# CHAPTER VII

## SUMMARY AND CONCLUSIONS

### I. SUMMARY

The steps followed in the development of the work presented are enumerated as follows:

1. Setting the stage for the development of the structure of the thesis.

2. Review of literature establishing the authenticity of Polymer Tempera Medium and its associate materials, Polymera **Retarder** and Polymera **Clay** Powder.

3. History of art education in the United States.

4. Establishing art expression as a medium of Democracy.

5. Establishing art expression as a possible pattern for world peace.

6. Evaluation and testing of materials.

7. The actual use of the materials cited in the form of experiments as exemplified in original works by the writer, presented in black and white photography with evaluations and procedures in the production of the illustrations listed under Figures in the Table of Contents, were presented and evaluated.

### II. CONCLUSIONS

Since Polymer Tempera Medium and its associate materials,

Polymera Tempera Retarder and Polymera Clay Powder, are comparatively new products on the open market, the writer felt evaluation of the above unit of material should be based on the known and the unknown. So, the methods of criticism and experiment were both involved in determining whether or not the Polymer unit of materials could enrich art expression at the public school and adult levels.

The materials listed in the experiments suggested procedures and the advantages enumerated in the experiments presented but a few of the possible uses of the materials used in their development. However, the creator of this study hoped that the limited exploration offered might afford enough general information to make it possible to open new vistas of expression in the field of art, both at the public school and adult levels.

Man has striven through the centuries to experience his own potentials that he might become aware of the same in other men. With such an understanding we can hope for the united brotherhood of all mankind if educators, in their special areas of understanding, will seriously work toward applying that pattern of understanding to the realization of world peace.

The problem of continuing craft projects to full realization of design and color was not included in this study as the use of materials and procedures seemed important to the support of the hypothesis that Polymer Tempera Medium and its

associate products, Polymera Retarder and Polymera Clay Powder, in combination with established art media can enrich art expression at any age level.

## III. NEWNESS OF MATERIAL

The newness of the materials has limited the field of research having direct bearing on their nature, but all the experiments offered in the body of the thesis have had a seasoning period of from eight to eleven months. They have been consistently observed by the writer and have offered no reason for refuting the evaluations set down as a result of the experiments. It is assumed then, that all qualities claimed to be valuable and useful in the materials explored do aid in the enrichment of art expression as a result of experience at the public school and adult levels.

Copies of the Polymer Tempera Handbook and Handbook Supplement may be obtained on request by writing to the company. The address is listed in the Bibliography.

The company cited above gave their blessing to the writer in answer to her letter informing them of her intention to evaluate their unit of materials on a Master's thesis level.

Though the material as a working unit in its present form is comparatively new, the Polymer process has been a functioning process in scientific experiment for many years,

as noted in the survey of literature in the introductory portion of this study. Though libraries gave little assistance in direct evaluation in relation to contemplated uses in works of art, there was still enough to promise support in solving the problem submitted in this work; the problem being, to determine the quality and worth of Polymer Tempera Medium, Polymera Retarder, and Polymera Clay Powder, in relation to art expression at the public school and adult levels, when used in combination with established media known to be water soluble.

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