U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES ■ Public Health Service
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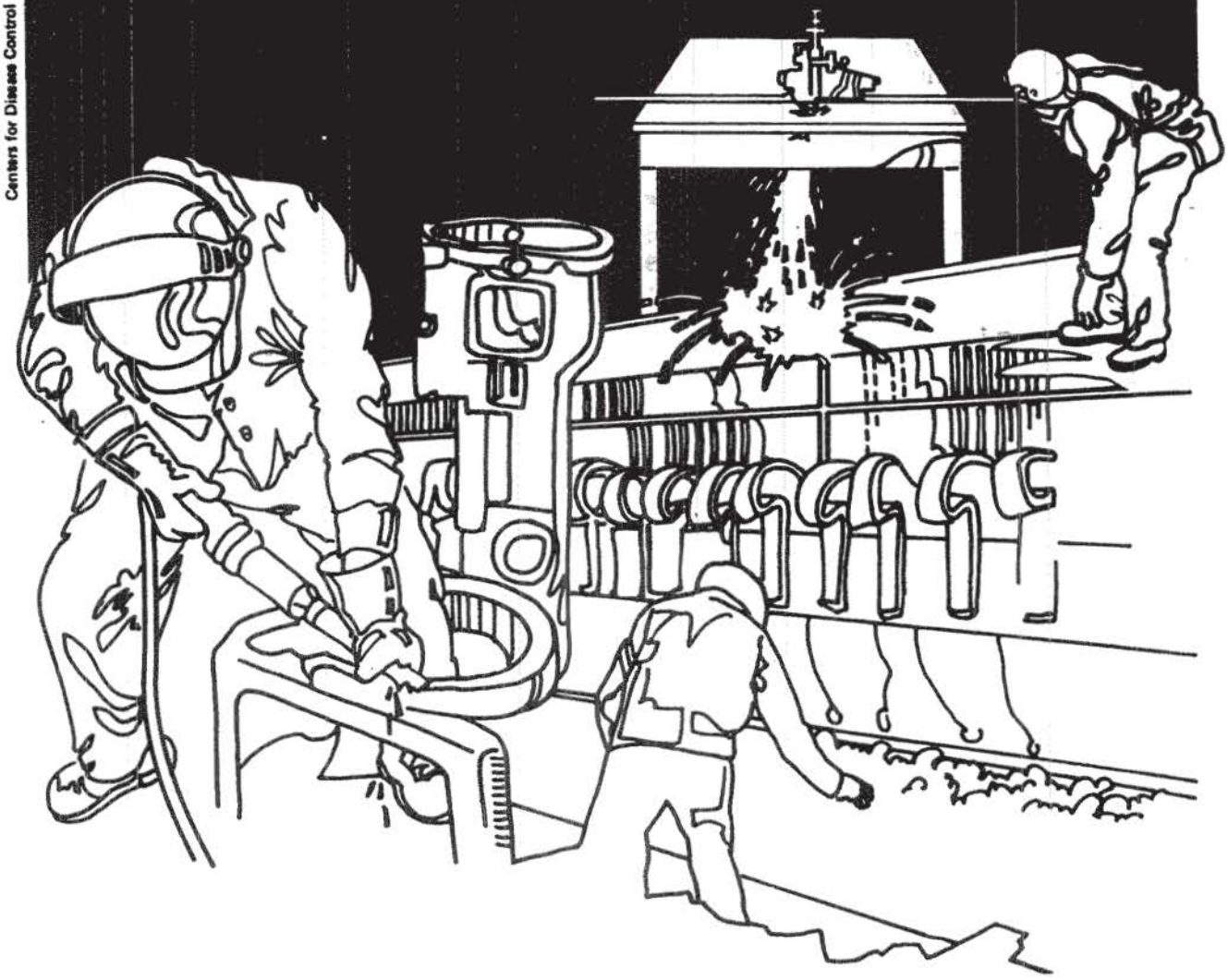
NIOSH



Health Hazard Evaluation Report

HETA 83-006-1379
ARTWORKSPACE
NEW YORK, NEW YORK

PREFACE

The Hazard Evaluations and Technical Assistance Branch of NIOSH conducts field investigations of possible health hazards in the workplace. These investigations are conducted under the authority of Section 20(a)(6) of the Occupational Safety and Health Act of 1970, 29 U.S.C. 669(a)(6) which authorizes the Secretary of Health and Human Services, following a written request from any employer or authorized representative of employees, to determine whether any substance normally found in the place of employment has potentially toxic effects in such concentrations as used or found.

The Hazard Evaluations and Technical Assistance Branch also provides, upon request, medical, nursing, and industrial hygiene technical and consultative assistance (TA) to Federal, state, and local agencies; labor; industry and other groups or individuals to control occupational health hazards and to prevent related trauma and disease.

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ARTWORKSPACE
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I. SUMMARY

In October 1982, the National Institute for Occupational Safety and Health (NIOSH) received a request to perform a health hazard evaluation from the members of Artworkspace, 5 East 17th Street, New York City. Artworkspace is a cooperative of approximately 20 artisans who rent common work space to house their studios. There are potters, jewelers, soft sculptors, graphic illustrators, painters and fabric designers in the group. There is no set product or production hours. The loft area which they share is a bout 40 x 120 feet (5,000 sq. ft.), with a 15 foot ceiling. The individual work areas are divided by makeshift barriers and measure from about 100 square feet to about 500-600 square feet.

The members of the group requested the hazard evaluation because they have developed concerns about the potential hazards of the materials with which they work and were seeking advice on the degree and types of hazards to which they are exposed, the use of protective equipment, disposal of small amounts of "hazardous materials" and their need for exhaust ventilation.

On October 28, 1982, January 13, 1983 and February 2, 1983, NIOSH representatives visited Artworkspace, discussed concerns with the artisans present, observed the conditions of the loft and did environmental testing for linalyl acetate. The use of this compound will be eliminated by the decision of the user to leave the cooperative.

Because of the variations in usage and the limited amount of usage of materials in the cooperative, it is doubtful that the members of Artworkspace are exposed to excessive concentrations of hazardous materials. Members of the cooperative were advised as to the importance of correct selection and maintenance of personal protection equipment, proper methods of waste disposal, ventilation of the kiln area, and some fire safety guides suggested by a Federal fire inspector.

KEYWORDS: SIC 8999 (Artist's studios) respirators, dermatitis, dust, personal protective equipment.

II. INTRODUCTION

In October, 1982, the National Institute for Occupational Safety and Health (NIOSH) received a request for a health hazard evaluation from representatives of Artworkspace, a cooperative of artisans. They had developed concerns about the potential hazards of the materials with which they work and were seeking advice on the degree and types of hazards to which they are exposed, the types of protective equipment that they might use, disposal of small amounts of "hazardous materials" and their need for exhaust ventilation. On October 28, 1982, January 13, and February 2, 1983, representatives of NIOSH visited the cooperative, discussed their concerns with the members present and performed a walk-through survey of the loft. Samples were collected to determine exposure to linalyl acetate, the major component of oil of lavender. Interim reports were issued in January and February, 1983.

III. BACKGROUND

Artworkspace is a cooperative of about 20 artisans. The membership of the cooperative changes occasionally, and now consists of potters, soft sculptors, fabric designers, jewelers, enamelers, illustrators and painters. For the past five years, they have rented a loft on the sixth floor of 5 East 17th Street, New York City. The loft contains 5,000 square feet of space. The approximate dimensions are 48 by 120 by 15 feet high. Windows are located at the front of the loft, mid-way on the west side of the building and at the rear. Make-shift barriers divide the loft into individual studios. The size of the studios range from 100 square feet to 500-600 square feet. There are common areas for storage and a sink area for cleaning equipment as well as rest rooms. Approximately in the center of the loft, near the side windows, is an area which contains two large pottery kilns. At the time of the first visit, the window was fitted with two small (9 inch diameter) fans. A large (2.5 foot diameter) fan was located in a window at the back of the loft.

Use of the loft facility by the individual artists varies considerably. One member had not been there for four months. Another was working there 8 to 10 hours per day for the past several weeks. Most members of the cooperative have "regular 9 to 5" jobs elsewhere, and work at the loft in the evenings and on weekends.

The studios generally were clean. Individuals are responsible for maintenance of their own studios. An attempt has been made to locate artisans according to their specialties (potters with potters, etc.) to localize the generation of clay dust and solvent vapors. A clean-up area with a sink is located near the front of the loft. Most members keep their work material in their own studios, but there are two areas for storage of supplies, etc. The main storage area is in the rear of the loft, and additional potters' materials are stored in the kiln area in the center of the loft.

Smoking is not allowed in the work area. The steam heat supplied to the loft is probably inadequate, for there are a number of electric space heaters which individuals have installed. As there are few windows, many of the members of the cooperative have fans to improve circulation. The general lighting seems to be adequate. Because of the fineness of their tasks, most individuals have supplemental lighting at their work desks.

Several of the artists who use gouache or tempera as their media generate a small and intermittent amount of dust in the preparation of their materials. The use of solvents such as turpentine is intermittent and is not of general concern to the artists. Several jewelers have unvented grinding/buffing wheels, but their use is intermittent and has not led to complaints from neighboring artists. The main generators of dust and fume in the loft are the potters. The large kilns are generally fired overnight or on week ends in an effort to limit exposure to the fumes generated.

The 20 artisans use hundreds of substances in producing their art. Most substances are used in quantities which are considered minute when compared to industrial use. For example, the scrimshaw artist carves intricate designs in small pieces of ivory and then colors the design with India ink. A mistake or change in design usually involves sanding away the existing carving. Sometimes the finished piece may receive a lacquer coating. The amounts of contaminants involved are minute, but the fineness of the work involves close contact. A potter may work with a hundred pounds of clay per batch, but even this amount is small considering that an industrial process such as brick manufacturing typically uses hundreds of tons of material per batch.

The amount of time involved in production may vary considerably. A particular artist may literally work night and day in producing a large order or for a showing, and then produce nothing for weeks or months.

The members of the cooperative have begun to develop an awareness of the occupational health hazards to which they are exposed. The cooperative has circulated a questionnaire among its members to identify the hazardous materials used and the health concerns of the individuals. The request for this health hazard evaluation stemmed from this interest.

IV. EVALUATION DESIGN AND METHODS

This evaluation differs from the usual requests which NIOSH receives in that no particular product, service, contaminant or health concern is involved. In a way, the cooperative consists of 20 different one or two man "industries", each with its own contaminants, exposures, protective equipment needs, disposal problems and "community air polution" concerns.

During the initial visit, the NIOSH representative interviewed each cooperative member present to determine his or her concerns, the

substances or media used, the potential "occupational" health problems, the individual's awareness of his or her potential hazard(s), the types and appropriateness of the protective equipment used (if any) and disposal, storage or "air pollution" problems of the individual.

Several members of the cooperative requested that a NIOSH medical officer confer with them about medical problems (mostly dermatitis). One of the most obvious problems of the cooperative was fire safety. As NIOSH is not proficient in fire safety inspections, arrangements were made for a fire inspector from one of the Federal government agencies to inspect the cooperative.

It soon became evident that environmental conditions in the loft vary daily, with the type and amount of work done by the members. It was decided that general sampling for airborne contaminants would be of limited value in this situation. There is little chance that exposure to any contaminant(s) would exceed the recommended limits or regulated standards for occupational exposure on a time weighted basis. All of the exposures of the members are intermittent, and to minimal amounts. Their hazardous materials, such as a particular color of oil paint, can be identified by refers for Community Health Centers to meet governing bond requirements of Section 330 in hospitals and public and private agencies. The most recent contact was from Regional Attorney in Chicago Regional office. These arrangements developed in Region II have bf "oil of lavender" by one of the potters. The potter used this coloring on her pieces. The manufacturer of the oil refused every request to identify the composition of the product. The Registry of Toxic Effects of Chemical Substances[1] states that oil of lavender is produced by the steam distillation of lavender flowers and that its main constituent is linalyl acetate. It was decided to collect samples to determine airborne exposure to linalyl acetate.

V. CONCERNS OF THE ARTISTS

The main concern of each artist interviewed dealt with questions about the toxicological nature of the materials he or she used in his or her work. They were concerned with the potential hazards of the dusts and/or vapors generated and the effects of exposure to them, individually, and to the work atmosphere of the loft in general. As an example, two of the artists who use brushes were in the habit of using their lips to form a better point on the brushes. They was concerned about possible ingestion of the chemical components of their medium, and the long term effects of their work habits.

Because of the small quantities used and the intermittent nature of their work, many felt that their hazards were limited, but they still wanted to know the potential hazards involved with their media. Many artists used surgical masks or single use respirators and were surprised to learn of the limited protection that these devices afforded against dusts and solvents. Only one "industrial" dust respirator was used in the loft. The condition of that respirator was such that it offered no protection at

all. The filters had not been changed in several months, the exhalation diaphragm was broken and the user had a thick beard. Any of these conditions would severely limit the effectiveness of the respirator.

Several of the artists use surgical gloves when working with solvents. It was explained to them that the effectiveness of the glove as a barrier to the penetration of solvents varies with the type of glove and the type of solvent and that the protection must be matched to the hazard.

The most universal complaint of the members of the cooperative centered around the generation of dust and fume by the potters. The non-potters realized that, given the limitations of the loft environment, a certain amount of dust generation was inevitable, however pictorial and graphic illustrators must have clean work surfaces because of the nature of their media, and some clashes are inevitable. The members of the cooperative wanted to know the best method of controlling clay dust during clean-up operations--sweeping, damp mopping, wet mopping, vacuuming, etc.

The major "environmental" concern of the artists was control of fumes generated by the use of the two large kilns. The kilns are located in the central area of the loft, near the side windows. At the time of NIOSH's first visit, the windows were fitted with two 9 inch diameter fans to aid in exhausting the fumes. A 2.5 foot diameter fan was located in the window at the rear of the loft. When the kilns were fired, all fans were activated, which caused fume to be dispersed throughout the rear of the loft.

VI. RESULTS & DISCUSSION

ENVIRONMENTAL

1. Toxicological hazards of specific media

There are hundreds of pigments and colors used by the painters, illustrators and fabric designers of the cooperative, and many types of materials and finishes used by the potters, ceramic makers and jewelers. This report is not the place to list the materials and their hazards. One reference for the ingredients used in artists materials is the "Registry of Toxic Effects of Chemical Substances", published by the U. S. Department of Health and Human Services[1]. This publication is highly technical and difficult to understand by non-technical people. A more practical reference is "Artist Beware" by Michael McCann, Watson-Guptill Publications[2], New York City, 1979. This book lists the ingredients of many of the materials which artists use and gives a brief description of the hazards associated with exposure to the materials. The Art Hazards Information Center in New York City will honor telephone requests to provide information about the hazards associated with artists' materials. Although the artists materials used in the cooperative are more properly classified as consumer products, many manufacturers will provide information about their products upon request.

2. Personal Protection

As most of the exposures of the members of the cooperative are intermittent and of short duration, the control method of choice would be the use of personal protection. Most of the members need guidance in the selection of the proper type of respirators and gloves and in the proper maintenance of this equipment.

Respiratory Protection

Many members of the cooperative use "respirators"--mostly surgical style masks or single use respirators. As previously noted, the one industrial respirator had not been maintained properly. Because of the limited amounts of materials used and the limited times of use, it is doubtful that individual artisans are exposed to excessive concentrations of the materials that they use. Individuals who wear respirators during periods of unusual exposure to dust or solvents should follow these guidelines:

A. Only respirators certified for use by NIOSH should be used. A copy of NIOSH's "Certified Equipment List" and its supplement is enclosed for reference.[3]

B. The choice of respirator should be related to the type of materials used by the artisan. Organic vapor respirators should be used by persons exposed to solvents. "Dust" respirators should be worn by persons exposed to dusts. Combination respirators are available for persons exposed to both vapors and dusts.

C. Respirators must be maintained in proper condition. Organic vapor cartridges and dust filters must be replaced periodically. As a rule of thumb, organic vapor cartridges should be replaced after eight hours of use or when the solvent's odor can be perceived through the cartrige. Dust filters should be replaced when the dust on the filter inhibits air flow through the filter. The filter's diaphram(s) should be in proper working order. Upon visual inspection, a diaphram should not be cracked, frayed or stuck to its setting. The effectiveness of a respirator is impaired if the user has a beard. The respirator's facepiece must form a good seal against the user's skin. This is impossible to achieve if the user has facial hair.

D. Special care must be taken when using single use respirators. Single use respirators are made of less substantial materials than are reusable respirators and do not maintain a good seal against the user's face. If the user chews gum or talks, the seal is easily broken. To be effective, the seal must be maintained. If an individual cannot maintain a proper seal when using a single, use respirator, he or she should switch to more substantial respirators.

Protective Gloves

Protective gloves, when used, should be chosen with care in order to offer maximum protection against the materials used by the individual. Many "protective gloves" are made of material which easily is permeated by many solvents. For example, ordinary latex gloves commonly used while dishwashing are waterproof, but offer little or no protection (are easily permeated) against solvents such as toluene. Polyvinyl alcohol gloves are almost impermeable to toluene, but dissolve in water (and sweat). One member of the cooperative, who had dermatitis of her hands and wrists, used protective gloves while using turpentine. The gloves were made of a material which offered little protection against the constituents of turpentine. The artist was advised to switch to gloves made of nitrile rubber.

Information about the permeability of materials to various solvents is not readily available. If other members of the cooperative have questions concerning the suitability of the protective gloves which they use, they should telephone the Region II NIOSH Office for help (212-264-2485).

3. Housekeeping

Ordinary vacuum cleaners are not recommended for use when cleaning clay dust. Individual particles of clay dust are extremely fine and may penetrate common paper vacuum cleaner bags. Industrial vacuum cleaners (some types can be used "wet") which use a HEPA filter would be a better choice of cleaning instrument. An alternative cleaning method would be the use of a wet mop. Small areas such as shelves, etc. should be cleaned of clay dust by use of wet rags.

4. Work Habits

Two members of the cooperative admitted to occasionally (until recently) using their lips and tongue to form a point on their brushes and/or cleaning small amounts of paint or ink from the brushes. This should never be done. Many paints/inks contain materials such as lead, chromium or cadmium. These materials are readily absorbed through the gastro-intestinal tract. Ingestion of material from this practice may produce a serious body burden. This procedure should be discontinued.

5. Waste Disposal

The cooperative had a small amount (about a cup full) of lead and requested advice as to the proper method of disposal. They also wanted advice on disposal of small amounts of solvents. Small quantities of lead may be placed in a shatter resistant container (such as a coffee can), sealed with masking tape, labeled and put out with the trash for pick-up. Small quantities--a pint or less--of solvents such as turpentine may be flushed down the sink with copious amounts of water. The Division of Solid Waste Management, N.Y. State

Department of Environmental Conservation, 50 Wolf Road, Albany, N.Y. 12201 (518-827-2693) is the state agency with authority on disposal of hazardous materials. Specific questions about the disposal of larger amounts of potentially hazardous materials should be refered to that group.

6. Ventilation of the Kiln Area.

Perhaps the most serious concern of the cooperative is the generation of fumes during the firing of the kilns. The kilns are located near the windows in the center of the loft. The windows were equipped with two 9 inch exhaust fans. A 2.5 foot diameter fan was located in the window in the rear of the loft. This system seemed to be inadequate to exhaust the fumes generated during the firing of the kilns. The two small fans in the kiln area are not powerful enough to remove all of the fumes generated. In addition, the large fan in the rear of the loft produces enough suction to draw fumes into the back of the area.

Since the time of the NIOSH visits, the kiln area has been fitted with a large industrial exhaust fan. Following the installation of the new fan, complaints about the fumes generated during firing of the kiln have abated, to be replaced with complaints about the noise generated by the fans. Exposure to the noise generated by the fan is far less than the industrial standard of 90 decibels for an eight hour exposure.

7. Fire Prevention.

Fire prevention is not a specialty of NIOSH. A fire inspector of a federal agency agreed to inspect the artists' cooperative. He was generally impressed with the conditions of the loft such as the wiring and placement of extinguishers, etc. Several conditions exist at the loft which should be mentioned.

A. Individual artists store various solvents in their work areas. If a solvent should spill near an operating electrical heater, a disaster could occur. Containers of solvents should be kept in a fire resistant cabinet. Individual artists should use only small amounts of solvent at any one time. When used in the work areas, solvents should be kept in, and dispensed from "safety cans".

B. The two large electric fired kilns should be placed on the fireproof shields that are available, but not being used.

C. The fire exit at the rear of the loft was bolted for security reasons, and obstructed with supplies. The bolt on the door was positioned quite high, and shorter members of the cooperative would have difficulty in opening it. The area around the fire exit should be cleaned so that the door is accessible. The position of the bolt should be lowered and the bolt should be replaced with a proper fire emergency exit system.

8. Use of Oil of Lavender

The main ingredient of Oil of Lavender is linalyl acetate. The only toxicological information available on this compound is that it is a mild skin irritant. No information about the effects of inhalation of the compound is known. The cooperative decided to position one of the exhaust fans previously used in the kiln area in the window in the area where the oil of lavender is used. This has lead to a great reduction in the complaints about the odor when the oil is used. Since the complaints about the use of the oil of lavender abated, it was decided not to pursue analysis of the samples collected to determine exposure to the airborne compound. No standard exists for exposure to airborne linalyl acetate, the main component of oil of lavender. The consumption of the oil was limited to a few ounces every few months. The complaints about its use involved the odor, and not any physiological response. The potter who uses oil of lavender has decided to leave the cooperative, therefore the concern about exposure to this compound will be eliminated.

MEDICAL

Twelve members of the cooperative were interviewed by a NIOSH medical officer. All were asymptomatic except for slight dermatitis of fingers or arms in three of the members. The finger dermatitis appeared to be related to dryness and possible defatting of the skin from exposure to solvents. The dermatitis of the arm was non-specific. The use of moisturizing creams and more care with the use of solvents was advised.

VII. RECOMMENDATIONS

Only respirators certified by NIOSH should be used by the members of the cooperative who use respirators. Periodic inspection should be made to assure that the respirators are in proper working condition.

Individuals who experience dermatitis from materials with which they work should use creams and gloves which offer maximum protection against the solvents used.

Individuals should not apply paint brushes to their lips to work a proper tip on the brushes.

Pottery (clay) dust should be vacuumed or be wetted before cleaning.

Volatile solvents should be stored in a solvent storage cabinet.

Ready access to the rear fire door should be maintained. The bolt to the fire door should be lowered.

VIII. REFERENCES

1. National Institute for Occupational Safety and Health. Registry of Toxic Effects of Chemical Substances, DHHS (NIOSH) Publication No. 81-116.

2. McCann, Michael, Artist Beware, Watson-Guptill Publications, New York, N.Y. 1979.

3. National Institute for Occupational Safety and Health. NIOSH Certified Equipment List. DHHS (NIOSH) Publication No. 80-144.

IX. AUTHORSHIP AND ACKNOWLEDGEMENTS

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X. DISTRIBUTION AND AVAILABILITY OF REPORT

Copies of this report are currently available upon request from NIOSH, Division of Standards Development and Technology Transfer, 4676 Columbia Parkway, Cincinnati, Ohio 45226. Afterr 90 days, the report will be available through the National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, Virginia 22161. Information regarding its availability through NTIS can be obtained from the NIOSH Publications Office at the Cincinnati Address. Copies of this report have been sent to:

1. Artworkspace, 5 East 17th St., N.Y., N.Y. 10003
2. U.S. DOL/OSHA, Region II Office, N.Y., N.Y.
3. U.S. DHHS/NIOSH, Region II Office, N.Y., N.Y.
4. N.Y. State Dept. of Health, Albany, N.Y.

Copies of this report should be posted in a prominent place accessible to the members of the cooperative for a period of 30 days.

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