PRODUCTS APPLICATION LABORATORY
B.F.GOODRICH CHEMICAL COMPANY
Avon Lake, Ohio

Customer Service Report

for

FISHER BODY

Lacquer Adhesion to Rigid Geon, Hi-Temp Geon and Abson

Project 2701-152A

by

R. W. Hallenburg

October 3, 1962

PRODUCTS APPLICATION LABORATORY
B.F.GOODRICH CHEMICAL COMPANY
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Project 2701-152A

September 10, 1962

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Introduction:

Fisher Body has requested that we dip samples of our plastics in their standard production lacquer to determine the possibility of painting molded plastic parts for automobiles.

Conclusion:

Their production lacquer adhered to rigid Geon, hi-temp and Absen very well.

Procedure:

A sample of Fisher Body's standard production lacquer was forwarded to the Products Application Laboratory by Art Korney.

This lacquer was poured into a shallow aluminum tray after mixing well. Pressed 6" x 6" samples of Geon 8759 Yellow, 8750 Natural, 8700A Gray and hi-temp 3005 Gray were each cut into three separate samples to facilitate dipping. Absen 89103 and 89104 were dipped as tensile dumbbells. Each sample was dipped horizontally and then turned over and dipped again. The samples were then hung overnight to dry in the paint spray hood.

One of each of the samples was bent and twisted to try and flake off the lacquer. The Lacquer [redacted] be well adhered to the plastic. The same samples were then scraped with [redacted] blade and the lacquer appeared to be as well adhered to the plastics as it [redacted] to metal.

All the [redacted] were then shipped to Art Korney. No exhaustive testing of adhesion was done.

If this company intends to use this method it would be well to run further physical properties on the coated samples to determine any detrimental effects possibly caused by the lacquer.

R. W. Hallenburg

Reference No.: 102-4-86

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gestion of protein. On a fixed intake of 60 g. daily the protein content of the faeces was estimated by a method which also estimated amino-acids. This was found to be higher in patients who had had gastrectomy than in normal individuals. The administration of 50 mg. tetracycline daily to patients who had had gastrectomy caused an immediate steep fall in the protein content of the faeces from 3.5–4 to 1–1.5 g.%, accompanied by an average gain in weight in only five days of 1.2 kg. The alteration in the protein content of the faeces was less startling than may appear, because these percentages are based on wet weight, and both the bulk and the water content of the faeces increased during treatment, but it is nevertheless genuine, the actual reduction in protein content being about 40%. It therefore seems that small amounts of tetracyclines improve utilization of protein when gastric secretion is defective. Though there are weighty reasons for discouraging the extensive use of antibiotics in human medicine for other purposes than the treatment of serious infections, their administration to improve nutrition in a selected group of patients seems to be warranted provided the beneficial effects can be confirmed.

FAMILY INFLUENCE ON SCHIZOPHRENIA

The influence of family relationships on the onset and course of a schizophrenic illness of one of its members has long attracted interest. Y. O. Alanen[1] in a study of the mothers of young schizophrenics concluded that they were more often disturbed than controls, tending to be domineering, excessively possessive, and to lack understanding of the patient's needs and feelings. He went so far as to suggest that the mother's attitude played a causal role, and offered this as an alternative to the more orthodox genetic explanation of the familial tendency of schizophrenia. The effect of the family setting on relapse of schizophrenic illness was studied by G. W. Brown and colleagues,[2] who showed that the readmission rate of discharged long-stay patients was greater if they returned to their wives or parents than if they went to stay with more distant relatives or lived in lodgings.

A further study is reported by G. W. Brown, E. M. Monck, G. M. Carstairs, and J. K. Wing[3] of the fate of 128 male schizophrenics aged 20–49 years, mostly short-stay cases. The patients were examined at the time of discharge from hospital and were followed up for a year. A "key" relative, usually the wife or mother, was identified, and estimates were made of the amount of emotion, hostility, and "dominant or directive" behaviour shown by this relative and the patient to one another.

Two hypotheses were tested. The first was that deterioration in the patient's condition would occur if he was discharged to a home in which he was exposed to strongly expressed emotion, hostility, or domineering behaviour. The second was that if he returned to such a home relapse would be less likely if the degree of personal contact with the family was small. A significantly greater proportion of patients returning to "high emotional involvement" homes deteriorated (76%) compared with those returning to "low emotional involvement" homes (28%). When the criterion of readmission to hospital was used the figures were 56% and 21% respectively. The patients from "high emotional involvement" homes were subdivided into two approximately equal groups depending on the length of time spent per week in contact with the "key" relative. In those patients showing a moderate or severe mental disturbance on discharge from hospital high contact did indeed show a significant relationship to deterioration. Though the same proportion of patients discharged to lodgings deteriorated as among those returning to their wives or relatives, the authors believe that the home relationships did play some direct part in determining deterioration.

R. E. L. Faris and H. W. Dunham[4] in Chicago and E. H. Hare[5] in Bristol observed that those city areas in which social isolation was most marked were peculiarly rich sources of schizophrenic patients. The social drift of potential schizophrenics to these areas is a likely reason for part of this high incidence, but many psychiatrists believe that social isolation in itself is an active agent in provoking the psychotic breakdown.[6] This paper of Brown and his colleagues suggests another possibility—that social isolation is sought as a form of prophylaxis. It also seems to contradict some of the current views on providing a therapeutic community, with its emphasis on increasing the social contacts of schizophrenic patients. Clearly further work is needed in this field.

POSSIBLE CARCINOGENICITY OF PLASTIC SPONGES

Plastics such as polyvinyl sponge have many uses in surgery and may come to be used even more. One bizarre application has been the attempt to construct shapely breasts in cases of hypomastia by the insertion of carefully moulded implants of "ivalon" polyvinyl sponge between the mammary gland and the underlying pectoral muscle. A disadvantage of the method is that after some months the new "breasts" tend to shrink, and may have to be removed because they become hard and uncomfortable. Dr. Cuthbert Dukes and Mr. B. C. V. Mitchley have had the opportunity to examine eight implants removed from four patients from 4 to 18 months after insertion and to compare the histological changes with those produced experimentally by the subcutaneous implantation of pieces of ivalon sponge in rats.[1]

The changes in the implants removed from both patients and rats were remarkably similar, the interstices of the sponge being filled with collagen-producing fibroblasts, phagocytes, and multinucleated giant cells,

[1] Alanen, Y. O., *Acta psychiat. scand.*, 1958, 33, 124.
[2] Brown, G. W., Carstairs, G. M., and Topping, G., *Lancet*, 1958, 2, 685.
[3] — Monck, E. M., Carstairs, G. M., and Wing, J. K., *Brit. J. prev. soc. Med.*, 1962, 16, 55.
[4] Faris, R. E. L., and Dunham, H. W., *Mental Disorders in Urban Areas*, 1939. University Press, Chicago.
[5] Hare, E. H., *J. ment. Sci.*, 1956, 102, 753.
[6] See *Brit. med. J.*, 1962, 1, 102.

[1] Dukes, Cuthbert E., and Mitchley, Bernard C. V., *Brit. J. plast. Surg.*, 1962, 15, 225.

and nourished by new capillaries. At the periphery of the implants detached particles of sponge surrounded by collections of phagocytes and foreign-body giant cells were found in the surrounding tissue. In the experiments on rats, 20 animals received "thin" implants (20 × 20 × 2 mm.) and 20 received "thick" implants (20 × 20 × 5 mm.). Palpable tumours appeared at the site of implantation, about 20 months later in the case of the thin implants, and some 6 months earlier in the case of the thick implants in the 14 rats which lived more than ten months. All of the tumours showed the histological changes already described, but the 14 thick implants were invaded by spindle-cell sarcomata arising in the connective tissue outside the sponge. Only one of the thin implants was similarly invaded.

There was no evidence of malignant change in any of the tissue removed from patients, but the implants had been in position for only short periods in relation to the rat experiments. Because the tissue response to the sponge was essentially the same in the human being and the rat the authors raise the question whether the remote effect—that is, the development of malignant sarcoma—might not also apply to the human species. Since the answer is not yet available they feel that the best advice they can give to plastic surgeons is to use sponges as thin and as porous as possible, and to remove them when their purpose is served.

HEALTH AND SOCIAL CLASS

Perhaps more than other social workers doctors are brought face to face with the complexity of forces which so often determine human welfare. The social aspects of medicine share fields of study with the social sciences, and the results from various fields may be needed to reinforce one another. The importance of thinking along these lines of combined approach is well exemplified in a recently published book, *Sociology in Medicine*,[1] of which the authors are respectively lecturers in Manchester University departments of social and preventive medicine and social anthropology. We need more efficient methods of using medical knowledge and of applying it to the changing social world. Medicine has a contribution to make in shaping the development of new communities and a new way of life, but these are matters in which medicine must co-operate with other social agencies. There is still no easy answer to the question, How best does one measure the degree of health, happiness, and efficiency in any social group or indeed in the individual? Social and demographic changes are closely linked with economic change, such as the development of new processes at work, and there is inevitably growing interest in the social stresses of modern industrial development and concomitant urbanization. Despite the undoubted limitations on any scale of social classification intended to be valid for the nation there are important differences from one social group to another in way of life and in prevailing pattern of disease. Eighty per cent. of the children born into marriages of completed fertility were born within the first ten years of marriage, but whereas the wives of salaried employees bore 89% of their children within ten years of marriage the wives of unskilled labourers bore only 75% during the same period. Variations in infantile mortality with social class have long been recognized, and while of recent years the decline in infant mortality has run more or less parallel in each social class the decline in neonatal mortality has lagged in the lower social classes.

There is a social-class gradient in the efficient use of health services as there is in the incidence of disease. Though poverty is much rarer in Great Britain than formerly extreme differences in physical environment still exist, and adverse environmental factors play an important part in the production of ill-health and personality disorder. The less-well-off people seem to experience illness not so much with greater frequency as with greater severity. Likewise the increase in volume of incapacitating sickness with advancing age is due not so much to increase in frequency of sickness episodes as to the longer period of incapacity associated with each episode.[2] Again, the recovery of a patient after discharge from hospital is profoundly influenced by his role in his household and at work.[3] Diseases, like persons, may exhibit social mobility: sometimes the diagnosis rather than the disease may be mobile, for there are fashions in diagnosis. Social mobility, whether upwards or downwards, can lead to stress in the individuals concerned, sometimes even to suicide. There is need for further study of the consequences of social mobility. How does a society which puts a premium on individual achievement handle those whose aspirations are thwarted?

It has been argued that mental disorders are social rather than medical concepts.[4] They define a class of people who cannot fit into the norms of behaviour expected by the society in which they live. There is general agreement that the old-fashioned mental-hospital system was bad in that it purchased a degree of social tranquillity outside the hospital by sacrificing individuals to a regime often open to serious criticism, and this, as was said recently in these columns,[5] must be weighed against whatever social liabilities are entailed in maintaining a disabled person outside hospital, for this may place a considerable strain on the relatives. The psychiatrist seeks to help his patient: the sociologist can help him to do so to the maximum benefit of both patient and community.

[1] Sumer, M. W., and Watson, W., *Sociology in Medicine*, 1962. Oxford University Press, London.
[2] *Seventh Report on Incapacitating Sickness, Scotland*, 1939. H.M.S.O., London.
[3] *Hospital and Community. Further Scottish Studies*, 1962. Oxford University Press, London.
[4] Wardel, C. J., *Social Factors in the Major Functional Psychoses*, 1962. Routledge and Kegan Paul, London.
[5] *Brit. med. J.*, 1962, 2, 904.

We announce with regret the death on December 8 of Professor R. F. Woolmer at the age of 54. He was professor of anaesthesia at the Royal College of Surgeons.

INDUSTRIAL HYGIENE AND TOXICOLOGY

Second Revised Edition

FRANK A. PATTY, *Editor*

VOLUME II

TOXICOLOGY

David W. Fassett and Don D. Irish, Editors

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Skin Irritation. Propylene dichloride on the open skin causes only mild irritation. Single short contacts will probably be without any effects. The intensity of the reaction is greatly increased when impinged on the skin or when held close to the skin by clothing.

Eye Irritation. Propylene dichloride causes some pain and irritation when splashed into the eye. It would not be expected to cause serious or permanent injury. It should be washed out immediately with water.

4. Hygienic Standards of Permissible Exposure

The threshold limit of propylene dichloride was established by the American Conference of Governmental Industrial Hygienists, in April, 1950, at 75 p.p.m. (350 mg./cu. meter.)

5. Flammability

The flammable limits of propylene dichloride are 3.4 to 14.5 per cent in air. The ignition temperature is 557° to 570°C.

VINYL CHLORIDE, $CH_2{=}CHCl$ (Monochloroethene)

1. Uses and Industrial Exposures

Vinyl chloride is used as a chemical intermediate primarily as a monomer in plastic manufacture. The fire and explosion hazard is by far the dominant problem in handling vinyl chloride.

2. Physical and Chemical Properties

Physical state: gas
Molecular weight: 62.5
Specific gravity: 0.9121 (20°/4°C.)
Melting point: —153.71°C.
Boiling point: —13.8°C.
Vapor density: 2.15 (air = 1)
Vapor pressure: 2380 mm. Hg (20°C.)
Solubility: slightly soluble in water; soluble in ethanol and ethyl ether
Flash point: —78°C. (open cup)
1 mg./liter = 391 p.p.m. and 1 p.p.m. = 2.56 mg./cu. meter at 25°C., 760 mm. Hg

3. Physiological Response

Vinyl chloride appears to be a material of relatively low toxicity. The principal response seems to be one of central nervous system depression, which may result in symptoms of dizziness and disorientation that are somewhat similar to the responses from ethyl chloride exposure. There is the possibility of some lung irritation occurring from chronic exposure as some edema is observed in acute vapor

exposure. Most investigators did not observe kidney or liver damage. One group of authors indicated some hyperemia of the liver and kidneys from acute exposure. It is concluded that the material has essentially a narcotic effect, with some lung irritation and a possibility of organ injury. There has been quite extensive use of this material in the chemical industry but no clinical reports of injury.

Acute Vapor Exposure. Patty *et al.*[100] reported the response of guinea pigs to single exposures to varying concentrations. The maximum time-concentrations in air for a single exposure survived by guinea pigs were as follows: 5 to 7 per cent for 1 hour and 2½ per cent for 8 hours. The maximum time-concentration in air for a single exposure without serious disturbance was 1½ per cent for 1 hour and 0.5 per cent for 8 hours. It will be noted that it requires a high concentration to cause death.

The same authors report that a concentration of 2½ per cent of vinyl chloride in the air for a period of 3 minutes will cause dizziness and disorientation in exposed men. They also observed a faintly pleasant odor at this concentration. Animals that died from acute exposures showed edema of the lungs and hyperemia of the kidneys and liver.

Men exposed to vinyl chloride detected a slight odor at 4100 p.p.m. This is the lowest concentration at which an odor was detected. At 6600 p.p.m. for ½ hour, they noticed dizziness, sleepiness, and distinct odor.

Vinyl chloride has been investigated as a possible material for anesthetic purposes by Peoples and Leake[101] and by Oster *et al.*[102] It was concluded that vinyl chloride was unsatisfactory for use as an anesthetic because of its circulatory and cardiac effects. These studies were at 10 to 20 vol. % and are hardly significant for industrial exposure.

Chronic Vapor Exposure. Essentially no investigations have been published on the response to chronic vapor exposure. Schaumann[45] exposed mice and rats and found that they tolerated a level sufficient for "light narcosis" for periods of 4 hours daily for 5 to 8 consecutive days or for 1 hour daily for 4 weeks without showing kidney or liver injury.

Torkelson *et al.*[103a] (to be published) report repeated exposures of animals for 7 hours/day, 5 days/week. At 500 p.p.m., rats showed increased liver weight and micropathology. At 200 and 100 p.p.m., rats showed increased liver weight, but no changes could be observed in dogs or guinea pigs. All species tolerated 50 p.p.m. for 6 months. Repeated exposures for 1 hour/day at 200 or 100 p.p.m. were tolerated without observable effect.

[100] *Chemical Safety Data Sheet SD-56*, Manufacturing Chemists Assoc., Washington, D. C., 1954.

[101] P. A. Patty, W. P. Yant, and C. P. White, *Public Health Repts. U. S.*, Reprint No. 1485, 43, No. 21 (Aug., 1930).

[102] R. A. Peoples and C. D. Leake, *J. Pharmacol. Exptl. Therap.*, 48, 381 (1933).

[103] R. H. Oster, C. J. Carr, J. C. Krantz, and M. J. Sauerwald, *Anesthesiology*, 8, 358 (1947).

Skin. The boiling point of vinyl chloride is so low that if the liquid material were spilled on the skin, there is a possibility of severe cooling and possibly frost bite.

Absorption, Excretion, and Metabolism. Very little is known of the metabolism of this compound. It is apparently readily absorbed by the lungs and rapidly excreted by the lungs. The little information that is available would indicate that a large part is excreted by the lungs unchanged.

4. Hygienic Standards of Permissible Exposure

The threshold limit of vinyl chloride was established by the American Conference of Governmental Industrial Hygienists, in April, 1959, at 500 p.p.m. (1300 mg./cu. meter).

Torkelson *et al.*[1955] suggest 100 p.p.m.

5. Flammability

The explosive limits of vinyl chloride are: lower, 4% and upper, 22% (by vol. in air). The autoignition temperature is 472.22°C.

6. Odor and Warning Properties

Vinyl chloride has a mild, sweetish odor. The odor is not an adequate warning property for excessive exposure.

VINYLIDENE CHLORIDE, $CH_2{=}CCl_2$ (1,1-Dichloroethylene)

1. Uses and Industrial Exposures

Vinylidene chloride is used as a chemical intermediate, particularly as a monomer in the production of plastics.

2. Physical and Chemical Properties

Physical state: clear colorless liquid
Molecular weight: 96.95
Specific gravity: 1.218 (20°/4°C.)
Freezing point: −122.5°C.
Boiling point: 31.7°C.
Vapor density: 3.34 (air = 1)
Vapor pressure: 591 mm. Hg (25°C.)
Refractive index: 1.427 (20°C.)
Per cent in "saturated" air: 78
Density of "saturated" air: 2.8 (air = 1)
Solubility: insoluble in water; soluble in organic solvents
Flash point: −15°C. (open cup)
1 mg./liter = 2.72 p.p.m. and 1 p.p.m. = 3.97 mg./cu. meter at 25°C., 760 mm. Hg

[1955] T. B. Torkelson, F. Oyen, and V. K. Rowe, *Am. Ind. Hyg. Assoc. J.*, 22, 331 (1961).