

mg m⁻³. This is based on the clinical observation of workers exposed daily to I and also by toxicol. exper. on lab. animals. The exposure to I decreases the human resistance to bacterial infection of the skin. It suppresses the production of *transferrin* [6803-89-3] and causes allergic reactions. The long-term exposure to 3 mg m⁻³ results in the air produces changes in the pathol. of thyroid gland in lab. animals.

104 192162a Evaluation of potential radon exposure from development of Georgia phosphate deposits. Eckhardt, G. G., Ambrose, J. P., Skowronski, M. G. (Nucl. Eng. Health Phys. Program, Georgia Inst. Technol., Atlanta, GA USA). *Min. Eng. (Littleton, Colo.)* 1986, 36(3), 195-6 (Eng.). A model was developed to calc. the potential radiol. consequences from developing U-cong. phosphate rocks at 2 sites in Georgia (a sparsely populated area, EC2, and a site 5 mi. southwest of Savannah, CH1). Max. occupational exposure for Ra at EC2 would be 1-2 WLM (working level month). The population dose for the country at this site (~2 mi. from the mine) was estd. as 2×10^{-10} WL or effectively 0. The calcd. Rn daughter concn. at CH1 was ~0.1 WL. Rn concn. at Savannah was estd. as 5×10^{-4} pCi L (or effectively 0).

104 192162b Permeation of chemical protective clothing by three binary solvent mixtures. Mickelsen, R. L., Roder, M. M., B. Schmitt, S. P. (Div. Saf. Res., Natl. Inst. Occup. Saf. Health, Morgantown, WV 26505-2888 USA). *Am. Ind. Hyg. Assoc. J.* 1986, 47(2), 236-40 (Eng.). The permeation of binary mixts. of common industrial solvents through glove materials was higher than that of single-component solvents and could not be predicted from the permeation rates of the pure components.

104 192164a Trace amounts of metals in blood of workers of the Belchatow industrial region. Adamaka-Dyniewska, Halina, Trojanowska, Barbara, Rosiek, Stanislaw, Bala, Tadeusz, Kowalczyk, Lucyna, Kowalska, Grazyna (Zakl. Farmakol. Klin., Wrocl. Akad. Med., Lodz, Pol.). *Bromatol. Chem. Toksykol.* 1985, 18(4), 246-50 (Pol.). Trace amts. of Cu, Zn, Mn, Fe, Cd, and Pb was detd. in a group of workers employed in the Belchatow Industrial Region, Poland, before startup of the elec. power station and the results were compared with those obtained from another group of subjects-inhabitants of Lodz. All subjects under investigation were comparable in respect of age and sex, and were not yet occupationally exposed to metals. The mean concn. of blood Cd and serum Cu in workers employed in the Belchatow Industrial Region were similar to those measured in inhabitants of Lodz. Serum Zn concn. was higher than those in urban population, and serum Mn and Fe concn. were lower. This discrepancy might depend on different living and environmental conditions, as well as on the extent of alc. consumption among the subjects under investigation. Results obtained constitute the initial data for the prospective appraisal of the environmental influence of Belchatow Industrial Region on blood trace levels of metals in subjects employed in this region.

104 192164b Assessment of the occupational risk among workers engaged in the production of divinyl-styrene rubber. Stamova, N., Spasovski, M., Mukhtarova, M., Khrsteva, V., Gancheva, N., Ivanova, S., Kirkov, V., Pernov, K., Panova, Z., Khinkova, L. (Bulg.). *Probl. Khim.* 1984, 9, 96-106 (Russ.). The working conditions are characterized in a SBR factory. C₆H₆ [71-43-2], styrene [100-42-5], and butadiene [106-99-0] are the most weighted detrimental factors in this factory. The health condition of the workers is given as well as recommendations for improvement of the working conditions.

104 192164c Influence of complete enclosure on liquid pool fires. Tatem, P. A., Williams, F. W., Ndubizu, C. C., Ramaker, D. E. (Combust. Fuels Branch, Nav. Res. Lab., Washington, DC USA). *Combust. Sci. Technol.* 1986, 43(3-4), 185-96 (Eng.). This work advances the area of zone modeling by the development of a 5-zone theor. model with time-incrementing capabilities to predict the results of liq. pool MeOH [67-54-1] fires in a gas-tight enclosure. The model consists of a liq. pool fuel bed, a developed flame above the fuel bed, a plume on top of the flame, the enclosure walls, and an ambient gaseous medium between the enclosure walls and the flame-plume boundaries. It assumes a temp.-dependent chem. equilibrium on the combustion products and evapd. fuel in the flame. It calculates the energy feedback within each defined zone and predicts the temps. (ambient gas, flame, and plume), the mass evapn. rate of the fuel, the total pressure, and the O₂ concn. within the enclosure. The early effects of O₂ concn. on a confined MeOH fire are well-established in this work through a comparison with an open MeOH fire model. Initially, the rising ambient gas temp. causes the mass evapn. rate of the fuel to increase. Eventually, the dropping O₂ concn. reduces the mass evapn. rate through its influence on the mass air entrainment rate and the flame height. There is no evidence in the region of the max. burning rate for the influence of nonstoichiometric combustion.

metabolites were obsd. The administration of 1 g I/day for 3 mo decreased the incidence of mutagenic activity of the worker urine extra. from 30 to 17%. The mutagenic activity of urine extra. from a control group of 19 persons not treated with I was 16%.

104 192165a Health hazard in occupational exposure to vinyl chloride. Goryk, Edward, Zudova, Zdena (Ustav Dalni Vadel. Stred. Zdrav. Pracov., Czech.). *Prac. Lek.* 1986, 38(1), 1-6 (Czech.). Occupational exposure to vinyl chloride (I) [75-01-4] in a plastics plant caused physical and psychol. problems resulting in a death rate from tumors 32.8% higher than normal and a suicide rate 23% higher than normal. The death-causing tumors were predominantly gastrointestinal and respiratory. During 10 yr, 378 employees died at the av. age of 62.8, their av. exposure to I was 21.9 yr. Exposure of 225 workers to I for an av. of 17.2 yr caused skin diseases 21.3, cardiovascular disturbances 15.6, and psychiatric disorders 8.9%. Exposure to I caused spontaneous abortion in 9.8% of 418 pregnant women.

104 192170a Determination of N-methylformamide in urine by gas chromatography. Cechova-Wicarova, Olga (Lek. Fak., JEP, Brno, Czech.). *Prac. Lek.* 1985, 37(10), 384-5 (Czech.). The urine of workers exposed daily to N,N-dimethylformamide (I) [68-12-2] contains its metabolite N-methylformamide (II) [123-39-7] as well as the unchanged I. To analyze urine in I exposure studies, a modified gas chromatog. method (O. Wicarova, 1980) was used with N-methylacetamide as the internal std. In the I + II concn. range of 0-157.5 $\times 10^{-3}$ μ mol/mL, the chromatog. response was linear and the relative detn. error was 53%.

104 192171a Genetic risk of occupational exposure to increased concentrations of polychlorinated biphenyls. Hols, Nora, Reznicek, Jan (Krajka Hyg. Stan., Usti nad Labem, Czech.). *Prac. Lek.* 1985, 37(10), 386-91 (Czech.). Exposure to polychlorinated biphenyls (PCB) in a plant where gravel was coated with hot asphalt caused increased levels of aberrant cells in peripheral lymphocytes. In a group of PCB-exposed workers, 2.87% had above-normal nos. of aberrant cells, as compared to 2.04% in a control group; in severely-exposed workers, this value was 3.14%. The levels of ascorbic acid [50-81-7], cholesterol [57-88-5], and β -lipoproteins in blood serum were correlated with the levels of PCB in the blood of exposed workers.

104 192172a Determination of mercapturates in urine. Madlo, Zdenek; Simova, Maria; Kubiakova, Bozena, Svobodova, Pavla (Krajka Hyg. Stan., KUNZ, Czech.). *Prac. Lek.* 1985, 37(9), 329-32 (Czech.). Occupational exposure to vinyl chloride [75-01-4] increased the concn. of mercapturates in urine of 101 factory workers to 38-55.4 μ mol SH/mmol creatinine (max. allowable concn. 36.6 μ mol SH). The anal. method for the detn. of mercapturates involved removal of amphoteric disulfides by ion exchange, removal of other interfering sulfides by redn. with NaBH₄ (with cor. for produced thiols), color reaction with Ellman's reagent, and spectrophotometry at 412 nm. Model expts. with S-2-hydroxyethyl-N-acetylcysteine (I) [15040-26-1] showed that 87-87.6% of the added I was detd. with 4-5.3% relative deviation.

104 192173a Ten-year study of mortality of workers exposed to carbon disulfide. Balcarova, Olga, Svestka, Bedrich; Svandova, Eva (Inst. Dalni Vadel. Lek. Farm., Czech.). *Prac. Lek.* 1985, 37(7), 256-61 (Czech.). The mortality rate in a group of 251 workers exposed to CS₂ in a rayon factory was 5.2% vs. 1.6% in a control group of 124 persons, but all the deceased were above the death expectancy age for Czechoslovakia. More cases of myocardial infarct, changes in ECG, chronic bronchitis, and vascular problems were encountered in the exposed group than in the non-exposed group.

104 192174a Vasospastic tendency and Raynaud's phenomenon in smelter workers exposed to arsenic. Lagerkvist, Birgitta; Linderholm, Haskan; Nordberg, Gunnar F. (Dep. Clin. Physiol., Univ. Umea, S-901 87 Umea, Swed.). *Environ. Res.* 1986, 39(2), 465-74 (Eng.). The systolic blood pressure was measured in the finger after local cooling in 47 workers from a Cu smelter who were habitually exposed to moderate amts. of As dust. The controls were 48 workers not exposed to As. The concn. of inorg. As including its metabolites in urine was detd. A difference was found between As-exposed workers and the controls in the finger systolic pressure at skin temps. of 10° and/or 15° expressed as a percentage of the pressure at 30° (FSP%) and prevalence of Raynaud's phenomenon. A low FSP% was taken to indicate vasospastic tendency. There was a covariation between the duration of exposure to As and the decrease in finger systolic pressure between the measurements at 30 and 10°. The uptake of As at the time of the study probably did not exceed 300 μ g/day. This was confirmed by estn. of the urinary excretion. The av. total As uptake was estd. to be ~4 g over 23 yr, which is less than the total uptake of 30 g of As by subjects who developed black foot disease. Increased vasospastic reactivity in the fingers and Raynaud's phenomenon in smelter workers seems to be

between α and β subunits. DNA and deoxyadenosine showed a similar electrophoretic shift but the other subunits seemed to interact based on the changes in electrophoresis.

104 163512 **Inhalation toxicity study on rats exposed to titanium tetrachloride atmospheric hydrolysis products for two years.** Lee K. P., Kelly D. P., Buchanan P. W., Tschamont H. J. (Cent. Res. Dev. Div., E. I. du Pont de Nemours and Co., Inc., Newark, DE 19713 USA). *Toxicol. Appl. Pharmacol.* 1986, 84(1), 41-51 (Eng). Rats were exposed to TiCl_4 hydrolysis products by inhalation exposure at aerosol concentrations of 0.01, 1.0, and 10 mg/m³ for 6 h/day, 5 days/week for 2 yr. There were no abnormal clinical signs, body wt. changes, or excessive mortality in any exposed groups. No pathological changes other than mild rhinitis were observed at 0.1 mg/m³. At 1.0 mg/m³, the incidence of mild rhinitis and tracheitis was increased. The lungs showed a moderate dust laden macrophage (dust cell) reaction with slight Type II pneumocyte hyperplasia in alveoli adjacent to the alveolar ducts. The pulmonary response at the 1.0 mg/m³ satisfied the basic criteria for a nuisance dust. At 10 mg/m³, extrapulmonary particle deposition occurred in the tracheobronchial lymph nodes, liver, and spleen without any tissue response. An increased incidence of rhinitis, tracheitis, and dust cell response with Type II pneumocyte hyperplasia, alveolar bronchiolization, foamy dust cell accumulation, alveolar proteinosis, cholesterol granuloma, and focal pleuritis was also noted. The pulmonary lesions developed in the alveolar duct region where dust cells had accumulated and had produced a chronic tissue response. In addition, a few well-differentiated, cystic keratinizing squamous carcinomas were developed from alveoli showing bronchiolization with squamous metaplasia in the alveolar duct region. No tumor metastases were found in other organs. The lung tumors were a unique type of epithelium induced tumor and had not been seen usually in man or animals. Therefore, the relevance to man of this type of lung tumor is highly questionable.

104 163513 **Prediction of human tumor cell chemosensitivity using the sister chromatid exchange assay.** Doen, Dennis F.; Kendall, Laura E.; Marion, Laurence J.; Tofilon, Philip J. (Sch. Med., Univ. California, San Francisco, CA 94143 USA). *Cancer Res.* 1986, 46(4), Pt. 1: 1589-602 (Eng). The sister chromatid exchange (SCE) assay was used to predict the chemosensitivity to 1,3-bis(2-chloroethyl)-1-nitrosourea [154-93-8] of various neoplastic cell subpopulations in 8 cell lines derived from human brain tumors. Because the SCE assay is based on analysis of individual cells, data obtained can be plotted as frequency histograms of SCE/chromosome, and the range of chemosensitivities of cell subpopulations can be identified easily. The SCE assay has predictive value as a clinical assay for drugs for which a strong correlation between cell kill and induction of SCE has been established.

104 163514 **More than additive toxicity of the combination of 1-methyl-1-nitrosourea plus 1,3-bis(2-chloroethyl)-1-nitrosourea in the rat.** Zeller, W. J.; Berger, M. R.; Henne, T.; Weber, E. (Inst. Toxicol. Chemother., German Cancer Res. Cent., D-6900 Heidelberg Fed. Rep. Ger.). *Cancer Res.* 1986, 46(4), Pt. 1: 1714-16 (Eng). The combination toxicity index of 1-methyl-1-nitrosourea [684-93-5] plus 1,3-bis(2-chloroethyl)-1-nitrosourea [154-93-8] tested in the rat was 0.32. This overdositive combination toxicity appears mainly to be due to severe damage of the intestinal mucosa as diagnosed by histol. examn. and to damage of pluripotent stem cells in the bone marrow as assessed by the spleen colony technique. The molar ratio of 1-methyl-1-nitrosourea to 1,3-bis(2-chloroethyl)-1-nitrosourea resulting in max. mortality was ~6. Concomitantly measured DNA interstrand crosslinking in bone marrow cells revealed a slight increase in DNA interstrand crosslinking following both drugs compared to 1,3-bis(2-chloroethyl)-1-nitrosourea alone.

104 163515 **Oncogenic response of strain A/J mice to inhaled chemicals.** Adkins, Bernard, Jr.; Van Stee, Edward W.; Simmons, Jane Ellen; Eustis, Scot L. (Northrop Serv., Inc., Research Triangle Park, NC 27709 USA). *J. Toxicol. Environ. Health.* 1986, 17(2-3), 311-22 (Eng). Strain A/J mice were exposed by inhalation for 6 h/day, 5 days/week for 6 mo to CS_2 [75-15-0], 1,2-dibromoethane [106-93-4], ethylene oxide [75-21-8], naphthalene [91-20-3], NO_2 , or vinyl chloride [75-01-4]. Significant increases in pulmonary adenoma formation were observed following exposure to 300 ppm CS_2 ; 20 and 50 ppm 1,2-dibromoethane; 70 and 200 ppm ethylene oxide; 10 ppm NO_2 ; and 50, 200, and 500 ppm vinyl chloride compared to control animals. Exposure of mice to 30 ppm naphthalene did not elicit adenoma. Histopathol. examn. of lungs from animals in these studies revealed multiple alveolar adenomas. These results provide further information for the validation of this *in vivo* model as a tool for predicting oncogenic potential following chem. exposure.

104 163516 **Effects of benzidine on some phosphohydrolases of rat tissues.** Kuchhar, Rachmi; Sharma, Rajashwar; Dani, H. M.; Ojha, S. (Dep. Biochem., Panjab Univ., Chandigarh, 160014 India). *Res. Bull. Panjab Univ., Sci.* 1985, 36(3-4), 295-7 (Eng). Benzidine [92-87-5] (20 mg/kg i.p.) affected the activities of *alk. phosphatase* [9001-78-9] and *acid phosphatase* [9001-77-8] in rat intestine, kidney, and liver. The activities of *glucose-6-phosphatase* [9001-39-2] and *fructose-1,6-diphosphatase* [9001-62-9] were below normal in the liver. The results indicated a gross disturbance in phosphate metabolism and gluconeogenesis. These changes occurred early (1 and 10 days) after the benzidine administration. The relation of the changes to benzidine carcinogenicity are discussed.

104 163517 **Extended correlation of a bond reactivity index with carcinogenicity and metabolism of polycyclic hydrocarbons: a molecular orbital theory.** Mohammad, S. Nour. (Dep. Phys. Meteorol., Indian Inst. Technol., Kharagpur, 721 302 India). *Indian J. Biochem. Biophys.* 1986, 23(1), 45-51 (Eng). Based on results obtained from a reactivity index $E(X,Y)$, attempts have been made

to predict relative carcinogenicity and metabolic activation. Metabolic sequence of a compound depends on the degree of unsaturation of peripheral bonds and this sequence is not effective unless the compound exhibits some optimum intrinsic electrophilicity. Calculations predicted in the basis of LUMO charge distributions agree well with results from bay region theory and from experiments. Predicted distributions of metabolites and relative carcinogenicity are also in line with observed data for the quantum.

104 163518 **Wearings' transfer of conditioned ethanol aversion from olfaction to ingestion depends on the unconditioned stimulus.** Jorvethka, Joseph; Molina, Juan C.; Spear, Norman E. (Univ. Cent. Binghamton, State Univ. New York Binghamton, NY 13901 USA). *Behav. Neural Biol.* 1986, 45(1), 57-70 (Eng). Wearing (21 day old) rats were exposed to EtOH [64-17-5] odor paired with an interoceptive (apomorphine induced) illness or exteroceptive (flashed) induced distress reinforcer. Twenty four hours later, EtOH preferences were measured in a behavioral olfactory test (EtOH vs. lemon odor) or an ingestion test (5.6% EtOH vs. 0.25% vol./vol. citric acid soln.). Wearing rats expressed substantial olfactory aversions, independent of the reinforcer employed in conditioning. During the drinking test, however, only rats that had experienced the EtOH odor paired with internal malaise showed a significant reduction in the intake of the EtOH soln. when compared to unpaired controls. Furthermore, rats that had experienced the EtOH odor paired with external distress drank significantly more of the EtOH soln. than their controls. These results provide further evidence that olfactory experiences with EtOH can lead to changes in EtOH ingestion, and indicate that the nature of the unconditioned stimulus is critical in establishing the ingestive effect.

104 163519 **Acetaldehyde may mediate reinforcement and aversion produced by ethanol.** An examination using a conditioned taste-aversion paradigm. Aragon, C. M. G.; Abulib, Murel; Amit, Z. (Cent. Stud. Behav. Neurobiol., Concordia Univ., Montreal, PQ Can. H3G 1M8). *Neuropharmacology* 1986, 25(1), 79-83 (Eng). Water-deprived rats were exposed to AcH [75-07-0], EtOH [64-17-5] or vehicle control. On the conditioning day, the animals were first presented with a soln. of saccharin after which the animals that were exposed to AcH received EtOH and those exposed to EtOH received AcH. Saccharin was again presented on 3 more occasions (testing days) without injection of drug. Using the percentage change in saccharin consumed from the first presentation as a measure of aversion, it was found that exposure to AcH blocked the taste aversion conditioned by EtOH. Animals exposed to EtOH showed no aversion to the saccharin which was paired with a small dose of AcH, indicating a sym. relation between EtOH and AcH at this dose. However, exposure with EtOH did not block the aversion produced by conditioning with larger doses of AcH. These results suggest that the mechanism underlying the smaller dose of the taste aversion conditioned with AcH may be central while the mechanism underlying the larger dose is probably peripheral.

104 163520 **Hydroxylation of acetone by ethanol- and acetone-inducible cytochrome P 450 in liver microsomes and reconstituted membranes.** Johansson, Inger; Elhassan, Erik; Norsten, Carina; Ingelman-Sundberg, Magnus. (Dep. Physiol. Chem., Karolinska Inst., S-104 01 Stockholm, Sweden). *FEBS Lett.* 1986, 196(1), 59-64 (Eng). Me_2CO [67-64-1] oxidn. in rat liver microsomes was induced 5- or 8-fold by the treatment of the animals with EtOH [64-17-5] or Me_2CO , resp. The apparent K_m of the reaction was 0.9 mM, a value lower than the concn. reported for plasma Me_2CO under starvation conditions. The major Me_2CO metabolite was acetol [116-09-6]. Me_2CO oxidn. in microsomes was inhibited by typical cytochrome P 450 [9035-51-2] inhibitors as well as by compounds (e.g. imidazole) known to interact with the EtOH inducible P 450 form. Antibodies against this P 450 isozyme were inhibitory for the reaction in rabbit liver microsomes and this enzyme was the only one that showed Me_2CO hydroxylation activity in reconstituted membranes. Imidazole inhibited the conversion of [^{14}C] Me_2CO into low-mol. wt. compds. (e.g. glucose [50-99-7]) *in vivo*. The EtOH and Me_2CO -inducible P 450 makes use of Me_2CO as an endogenous substrate in the utilization of the compd. for, e.g. glucose prodn. under conditions of starvation and diabetic ketoacidosis.

104 163521 **The effect of 5,5'-dithiobis[1-methyltetrazole] on cytoplasmic aldehyde dehydrogenase and its implications for cephalosporin-alcohol reactions.** Kitson, Trevor M. (Dep. Chem. Biochem., Massey Univ., Palmerston North, N. Z.). *Alcohol. Clin. Exp. Res.* 1986, 10(1), 27-32 (Eng). Cephalosporin [11111-12-9] antibiotics with a 1-methyltetrazolyl-5-thio side chain have the ability to cause an unpleasant flushing reaction if they are taken some time before EtOH [64-17-5] consumption. It is proposed that the explanation for this is that the side chain becomes liberated *in vivo* and oxidized to 5,5'-dithiobis[1-methyltetrazole] (I) [62671-35-9] or to a mixed disulfide analog which then inactivates aldehyde dehydrogenase [9028-86-8]. Support for this proposal is given by the interaction *in vitro* between the disulfides and sheep liver cytoplasmic aldehyde dehydrogenase. I has a rapid and pronounced inactive effect, very similar in many ways (though not identical) to that of disulfiram, to which it has a structural similarity. 1-Methyl-5-methylthiotetrazole [68700-68-5] (which is a simple model of the antibiotics) and 1-methyltetrazole-5-thiol [13183-79-4] have no effect on the enzyme *in vitro*, but methyl 5-(1-methyltetrazolyl) disulfide [101584-86-7] is a potent inactivator; this also supports the proposed pathway.

104 163522 **Effect of ethanol on gamma-aminobutyric acid in the rat: interaction with carnitine.** Corbett, R.; Leonard, B. E. (Pharmacology Dep., Univ. Coll. Galway, Galway, Ire). *Biol.*