We have reevaluated the capacity of newborn rat livers to conjugate bilirubin and p-nitrophenol with glucuronic acid after activation of liver homogenates with EDTA and utilizing improved assaying conditions as previously reported.

We have found that the newborn liver conjugates p-nitrophenol at levels similar to adult male rats while bilirubin conjugation is not detected before the 12th hour of life. Phenobarbital injections to the mother during the last 8 days of pregnancy induced the prenatal development of this enzyme and 2-hour-old fetuses had about 1/3 of the adult level of bilirubin UDP-glucuronyltransferase activity. The capacity to conjugate p-nitrophenol was not significantly altered by phenobarbital.

The activation of UDP-glucuronyltransferase by EDTA has been studied by electron microscopy. We have found that EDTA induces the conversion of rough endoplasmic reticular membranes into smooth membranes. This finding correlates significantly with the increase of hepatic smooth membranes after birth and that induced by phenobarbital administration. (SPR)

85 *A Treatment for the Complications of Prolonged Artificial Ventilation of Small Infants.* PENELOPE CAVE*, WILLIAM H. NORTHWAY, Jr.*, MARSHALL KLAUS and GRANT FLETCHER*, Stanford Univ. Sch. of Med., Palo Alto, Cal.

All infants in our center with severe respiratory distress syndrome who have required artificial ventilation with 80–100 % O_2 for more than 5 days have shown abnormalities in the lungs with characteristic radiologic findings and prolonged hypercarbia following extubation. Microscopic examination of lung sections of 13 infants who died revealed hypertrophic bronchial mucosal glands and necrotic bronchial epithelium blocking some of the fine airways. The known tendency of the small airways of an infant to collapse and the microscopic appearance of the lung suggested that after extubation vigorous pulmonary drainage might be of value. To prevent this complication rapid graded weaning from the ventilator is now attempted and following extubation, postural drainage, chest percussion, vibration, and tracheal suction under direct vision are performed at first hourly, decreasing to daily intervals by the third day.

8 infants (1700–2020 g) maintained on a respirator for 5 to 17 days but not receiving intensive pulmonary physiotherapy, still had evidence of pulmonary disease 2–18 months after extubation. 3 infants (1700–2500 g) who received intensive pulmonary drainage after being on the respirator for 2 ½, 6 ½, 7 ½ days had no apparent pulmonary disease 18, 27, 30 days after extubation. 6 infants (860–4000 gm) with respiratory failure associated with other diseases who were maintained on a ventilator for 1–2 days and who were also treated with intensive suctioning following extubation, recovered promptly. These observations suggest that some of the complications of prolonged artificial ventilation with high O_2 concentrations may be preventable. (SPR)

86 *The Prevention of Prolonged Apnea as a Complication of Prematurity.* WILLIAM J. DAILY*, H. BELTON P. MEYER* and MARSHALL KLAUS, Stanford Univ. Sch. of Med., Palo Alto, Cal.

Hypoxia secondary to apnea has been suggested as one cause of neurological abnormalities in surviving premature infants. If hypoxia is, in part, responsible for brain damage, prevention by a simple and reliable means would be important. Using an impedance plethysmograph incorporating an alarm system the respiratory patterns of 15 normal premature infants and 7 infants recovering from the respiratory distress syndrome (RDS) weighing 862–2552 gm have been continuously monitred for 5–16 days. In 7 infants we obtained simultaneous ECG tracings. The duration of apneic periods >30 s, ECG changes, and arterial blood gases were measured and the appearance of the infant and the nature of the stimulus required to re-initiate respiration was recorded.

A total of 217 apneic periods of > 30 s were observed in the 22 infants. 6 infants (3 with healing RDS) had >10 apneic episodes. Apneic periods began at end expiration and were rare in infants weighing >1750 g. More frequent apneic periods at higher incubator temperatures were sometimes noted. When simultaneous ECG tracings were obtained marked cardiac slowing was noted within 10–15 s of the onset of apnea. Bradycardia (< 100) ensued within 20–30 s. Prolonged apnea (> 30 s) was associated with suggestive evidence of hypoxia (loss of muscle tone, cyanosis and mottling) whereas apnea of < 20 s duration was not. This study suggests apnea is more frequent than previously noted and is poorly tolerated after 20 s. Utilizing an apnea alarm, hypoxia with resultant brain damage may be prevented. (SPR)

87 *Squamous Metaplasia and Necrosis of Trachea and Larynx after Nasotracheal Intubation of Premature Infants.* PAUL SYMCHYCH*, MARCEL CADOTTE*, RITA FOJACO* and WILLIAM BLANC, Columbia Univ., and Babies Hosp., New York, N.Y.

Potential hazards of intubation to larnygeal function have not been emphasized in the newborn and the cause of difficulties encountered at extubation are not clear. We examined at autopsy the trachea of 13 infants with respiratory distress, aged 14 to 98 days, who had been intubated for 9 to 44 days. Extensive diffuse necrosis of the mucosa, at times of cartilage rings, was seen in 4, multifocal squamous metaplasia in 2 and diffuse metaplasia in 6. These changes, related to decubital ulceration by a tightly fitted tube, and chronic irritation, explain the inability of the trachea to remove bronchial secretion after extubation. The spectrum of early and late changes was followed in 25 larynxes. Besides known alterations such as ulcers, metaplasia and granulomas, there were deep lesions attributed to compression of vessels between the tube and the cartilages. Most striking was the necrosis and atrophy of intrinsic laryngeal muscles, even with a relatively preserved mucosa. This might well lead to permanent laryngeal dysfunction. (SPR)

88 *Acetylcholine in the Treatment of Idiopathic Respiratory distress Syndrome.* A.N. MOGHADAM*, ESHAGH ESHAGHPOUR*, LEONE MATTIOLI* and MARGARET L. WILLIAMS*, Department of Pediatrics, University of Pennsylvania School of Medicine and Philadelphia General Hospital, Philadelphia, Pa. (introduced by Lewis A. Barness).

In view of direct observations confirming low pulmonary blood flow in the idiopathic respiratory distress syndrome (IRDS) considerable interest in therapy directed toward relief of pulmonary hypoperfusion has been stimulated. Reports of the efficacy of infusin vasodilating agents have been conflicting to date. In the present study, infusions of acetylcholine (25–100 mg/