37. Kleitman N: Sleep and Wakefulness. Chicago, University of Chicago Press, 1963

38. Rutenfranz J, Colquhoun WP: Circadian rhythms in human performance. Scand J Work Environ Health 1979; 5:167-177

39. Horne JA, Brass CG, Pettitt AN: Circadian performance differences between morning and evening "types." Ergonomics 1980; 23:29-36

40. Craig A, Wilkinson RT, Colquhoun WP: Diurnal variation in vigilance efficiency. Ergonomics 1981; 24(8):641-651

41. Andlauer P, Metz B: Le travail en equipes alternantes, *In* Scherrer J (Ed): Physiologie du Travail—Ergonomie (II). Paris, Masson, 1967, pp 272-281

42. Bessou J, Pechker R: Repartition des accidents du travail a FEDF. Arch Mal Prof 1963; 24:184-190

43. Lambert G: L'adaptation physiologique et psychologique de l' homme aux conditions de vie desertique. Paris, Hermann, 1968

44. Mouton A: Apects particuliers de l'adaptation du travail a l' homme en milieu Saharien, thesis. Lille, France, 1960

45. Bjerner BA, Holm A, Swensson A: Diurnal variation in mental performance—A study of three shift workers. Br J Ind Med 1955; 12:103

46. Colquhoun WP: Accidents, injuries and shift work, *In* Rentos PG, Shepard RD (Eds): Shift Work and Health, publication No. NIOSH 76-203. US Dept of Health, Education, and Welfare, 1976, pp 160-175

47. Colquhoun WP, Blake MJF, Edwards RS: Experimental studies of shift work—III: Stabilized 12-hour shift system. Ergonomics 1969; 12:865-882

48. Knauth P, Ilmarinen J: Continuous measurement of body temperature during a three-week experiment with inverted working and sleeping hours. *In* Colquhoun WP, Folkard S, Knauth P, et al (Eds): Experimental Studies of Shift Work. Opladen, Westdeutscher Verlag, 1975, pp 66-73

49. Patkai P, Pettersson K, Akerstedt T: The diurnal pattern of some physiological and psychological functions in permanent night workers and in men working on a two-shift (day and night) system, *In* Colquhoun WP, Folkard S, Knauth P, et al (Eds): Experimental Studies of Shift Work. Opladen, Westdeutscher Verlag, 1975, pp 131-141

50. Knauth P, Rutenfranz J: The effect of noise on the sleep of night-workers, *In* Colquhoun WP, Folkard S, Knauth P, et al: (Eds): Experimental Studies of Shift Work. Opladen, Westdeutscher Verlag, 1975, pp 57-65

51. Rutenfranz J, Klimmer F, Knauth P: Desynchronization of different physiological functions during three weeks of experimental nightshift with limited and unlimited sleep, *In* Colquhoun WP, Folkard S, Knauth P, et al (Eds): Experimental Studies of Shift Work. Opladen, Westdeutscher Verlag, 1975, pp 74-77

52. Verhaegen P, Maasen A, Meers A: Health problems in shift workers, *In* Johnson LC, Tepas DI, Colquhoun WP, et al (Eds): Biological Rhythms, Sleep and Shift Work. New York, SP Medical & Scientific Books, 1981, pp 271-282

53. Czeisler CA, Moore-Ede MC, Coleman RM: Rotating shift work schedules that disrupt sleep are improved by applying circadian principles. Science 1982; 217:460-463

Medical Practice Questions

EDITOR'S NOTE: *From time to time medical practice questions from organizations with a legitimate interest in the information are referred to the Scientific Board by the Quality Care Review Commission of the California Medical Association. The opinions offered are based on training, experience and literature reviewed by specialists. These opinions are, however, informational only and should not be interpreted as directives, instructions or policy statements.*

Reconsideration of Biofeedback

QUESTION:

In your judgment, are there valid medical indications for the use of biofeedback? If so, under what circumstances would biofeedback be accepted therapy?

OPINION:

In the opinion of the Advisory Panels on Internal Medicine and Neurology, biofeedback has legitimate use as part of a medical treatment plan. There are valid medical indications for the use of biofeedback for conditions such as chronic muscle contraction headaches, certain mixed headaches (of muscular and vascular origin), migraine, chronic pain syndromes of muscular or vascular origin, and other psychophysiologic states where excess tension, stress and high autonomic arousal are part of the syndrome. Modest results have been achieved in patients with moderate hypertension.

Biofeedback for neuromuscular reeducation and organic disease problems such as convulsive states and ectopic beats should be considered investigational. Its role as an adjunct to more established management remains unknown at this time.

Biofeedback is only as effective as the skill of the therapist and the ability of the patient to learn the techniques of relaxation. Because the treatment works in a limited number of patients and has the potential for overuse, candidates for therapy must be well selected. As significant underlying psychological problems may arise during the course of therapy, biofeedback practitioners should be highly trained in the fields of psychology and counseling.