DISCOVERY OF A COAL-SEAM NEAR LAKHPAT VILLAGE, NORTHWESTERN KUTCH AND ITS SIGNIFICANCE

RANJIT K. BANERJI AND P. K. SARASWATI
Department of Civil Engineering,
Indian Institute of Technology, Powai,
Bombay 400 076, India

DURING the course of a recent geological investigation carried out near Lakhpat village (23° 49′; 68° 46.), northwestern Kutch, Gujarat, a coal-seam has been observed to occur at a depth of approximately 10 m in a newly dug water well. This occurrence of coal at a shallow depth is being reported for the first time from this locality. The well is situated about 250 m south of the Lakhpat fort gate on the east side of the Lakhpat-Narayan Sarovar motorable road. This well is dug through a white to buff-coloured fossiliferous limestone and marl and the coal-seam of about 1 m thickness occurs in association of carbonaceous shale at the bottom of the well. The generalized sequence met in this well is as follows:

White to buff coloured, highly fossiliferous limestone, studded with larger foraminiferal fossils such as *Nummulites, Discocyclina, Alveolina* and *Dictyoconoides* etc.	7 m
Yellowish brown marl	1 m
Dark grey carbonaceous shale	1.5 m
Coal and lignitic coal	> 1 m

(Thickness in metres Approx.)

The sequence of limestone and marl can be observed as outcropping in the neighbourhood towards north, northeast and south, however, the coal-seam is nowhere exposed on the surface. The identification of the above listed fossils in the limestone bed helps in assigning an Eocene age to the sequence.

The coal is dull to bright, dark brown to black in colour and is banded in structure. The bright lustrous portion is bituminous in nature and breaks into cubes on exposure. The dull portion is more lignitic and other parts are somewhat ashy and kaolinized. In general, three types of coal can be identified:

1. *Lignitic coal* : dull brownish in colour and shaly.
2. *Spotted coal* : light in colour, somewhat ashy and kaolinized.
3. *Bituminous coal.* : black, fissile, bright and lustrous like that of the tar.

The relative proportions of these coal fractions could not be worked out as the well was full of water. Further laboratory study on different types of coals and associated bed is presently being carried out.

In northwestern Kutch, the occurrence of lignite and coal is known from other two localities—near Panandhro (23° 41′; 68° 45′) where the coal-seams occur within the Tertiary sequence overlying the Deccan Traps, and near Ghuneri (23° 47′; 68° 53′) where the occurrence of coal is reported in the Early Cretaceous sequence[1,2].

The present discovery of coal is from the lower part of the Tertiary sequence which overlies the Deccan Traps (Cretaceous-Palaeocene) and is more than 20 km north of similar known occurrence in Panandhro. Considering its stratigraphic configuration, it is suggested that this new coal-seam in all probability is the sub-surface continuation of the Panandhro seam, which is like wise sandwiched between the Eocene Limestone and the Deccan Traps.

It is thus concluded that the occurrence of coal in northwestern Kutch is far more extensive covering a large area than hitherto estimated. A proper evaluation of this occurrence is therefore necessary through a detailed subsurface exploration programme. The exploitation of the coal will be economically viable for this desertic region of western India, being remote to the central coal field areas of the country.

The authors express their sincere gratitude to Prof. A. Parthasarathy, for his constant encouragement and help during the course of this investigation.

23 *January* 1982

1. Chatterjee, P. K., *Geol. Surv. India*, 1964, part 3, p. 298.
2. Pareek, H. S., *J. Geol. Soc. India*, 1980, **21**, 343.

ANNUAL VARIATION IN A NOCICEPTIVE REACTION IN MICE

K. RAMABADRAN*, N. PRUDHOMME AND J. J. C. JACOB
Laboratory of Pharmacology, Pasteur Institute,
28, Rue du Docteur Roux, F-75015,
Paris, France
*Present address: Department of Pharmacology, Faculty of Medicine, National University of Singapore, Kent Ridge, Singapore 0511.

SEASONAL variations in the sensitivity of the guinea pig isolated ileum to naloxone[1] and in the apparent number of binding sites of [^{3}H] opioid agonists and antagonists in mouse brain homogenates[2] have been reported. Accordingly the latter might influence nociception, an important physiological function which is at least partly regulated by endogenous morphines. Interestingly we have observed in the studies on nociception that the latencies to jump were too short in saline groups of mice during June-July. Hence it seemed worthwhile to find out whether such a type of variation in nociceptive responsiveness followed a regular rhythm, using data that had been accumulated for the past three years and the results obtained provide the basis of this report.

Swiss OF_1 Strain, 4-5 weeks old (20-28 g), maintained at standard laboratory conditions were used throughout the study. Nociceptive reactions were measured using the hot plate technique previously described[3,4] The apparatus consisted of a hot plate on which was placed a restraining cylinder (height 17 cm; diameter 13 cm). The temperature of the hot plate was 55°C. Animals which did not respond after 180 sec were removed from the hot plate "cut-off time". All these experiments were carried out between 2·00 p.m. and 6·00 p.m. The latencies are expressed as means ± S. E. M. (table 1)

TABLE 1
Annual variation in latencies to jump and lick (sec) ± S. E. M. in mice

Month	Responses Jumping latency	Licking latency	No of mice used (*n*)
January	90 ± 2	13 ± 1	150
February	94 ± 4	14 ± 1	60
March	96 ± 6	11 ± 1	20
April	84 ± 4	9 ± 1	40
May	76 ± 3	8 ± 1	80
June	66 ± 4	9 ± 1	70
July	64 ± 3	9 ± 1	50
August	64 ± 4	9 ± 1	20
September	84 ± 5	11 ± 2	20
October	108 ± 6	13 ± 1	30
November	118 ± 4	13 ± 1	30
December	98 ± 4	12 ± 1	80

The temperature of the hot plate was 55° C. "Cut-off time" was 180 sec.

Marked variations in nociceptive reactions were noticed. There was a gradual reduction in jumping latencies from March to August, after which they showed an increase. A similar trend was also observed in the licking latencies.

Our findings point to a possible role for endorphin systems in the annual regulation of nociception. Our data agree with that of Codd and Byrne[2] who reported seasonal fluctuation in the apparent number of [^{3}H] naloxone binding sites in mouse brain homogenates. These investigators also noticed that [^{3}H] naloxone binding was less in June, July and August, a period where we found that the latencies of nociceptive reactions were small. [^{3}H] Naloxone binding in the brain homogenates was greater from October through March and correspondingly we observed that the latencies to lick and jump were longer. The reduction in jumping latency produced by naloxone was smaller in June, July and August, whereas it produced greater hyperalgesia in other months (unpublished observations). Hence it is conceivable that oscillations in nociceptive sensitivity might be due to rhythmic fluctuations in the concentration of endorphins. This possibility remains to be confirmed. Whatever the underlying mechanisms might be, the present analysis clearly demonstrates an annual variation in the reactivity to thermoalgesic stimuli in mice.

This research work was supported by grants from D. R. E. T. (contract No. 79/537 and 80/671) and I. N. S. E. R. M. (A. T. P. Le Comportment; 80-79-112).

28 *September* 1981

1. Rodriguez, R., Lujan, M. and Vargas-Ortega, V., *J. Pharm. Pharmacol.*, 1980, **32**, 363.
2. Codd, E. E. and Byrne, W. L., *Life Sci.*, 1981, **28**, 2577.
3. Jacob, J. J., Tremblay, E. C. and Colombel, M-C., *Psychopharmacologia (Berl)*, 1974, **37**, 217.
4. Jacob, J. J. and Ramabadran, K., *Br. J. Pharmacol.* 1978, **64**, 91.

EFFECT OF AGE ON PLASMA LIPOPROTEIN CHOLESTEROL IN NORMAL SUBJECTS

RAJVIR DAHIYA AND R. N. CHAKRAVARTI
Department of Experimental Medicine,
Postgraduate Institute of Medical Education and Research, Chandigarh 160012, India

IN recent times, several clinical and epidemiological studies have emphasised the importance of plasma lipoprotein cholesterol and the development of coronary heart disease and atherosclerosis.[1-3] Many studies have been carried out in western countries to find out the normal pattern of lipoprotein cholesterol[4,5] which is significantly different from that of underdeveloped countries[5]. The age is the most important factor in the development of coronary heart disease and atherosclerosis. No report is available in literature regarding the normal levels of plasma lipoprotein cholesterol in healthy Indian subjects of different age groups. The present study therefore has been undertaken to find out the normal pattern of lipoprotein cholesterol in healthy individuals of different age groups in Chandigarh area.

Clinically healthy male individuals (numbering 382) of varying ages were considered for the present study and were grouped according to their age. Group I(87), Group II(93), Group III(95) and Group IV(107)