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Source Rock Analysis of Well 6507/11-2			
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Saga Petroleum A/S			
RESPONSIBLE SCIENTIST/ PROSJEKTANSVARLIG			
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SUMMARY/ SAMMENDRAG

Based on undertaken analysis, the analysed section 1000-2882m was divided into nine zones:

A: 1000-1360m:	Immature.	No source rock potential.
B: 1360-1720m:	Immature.	No source rock potential.
C: 1720-1904m:	Immature.	No source rock potential.
D: 1904-1949m:	Immature.	Rich source rock potential for paraffinic oil and gas.
E: 1949-2030m:	Immature.	Good source rock potential for gas.
F: 2030-2408m:	Immature.	No source rock potential.
G: 2408-2534m:	Immature.	Rich source rock potential for gas.
H: 2534-2660m:	Immature.	Rich source rock potential for gas.
I: 2660-2882m:	Immature.	Top 90m as Zones G+H, bottom-potential for gas.

KEY WORDS/ STIKKORD

Source rock	Haltenbanken

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EXPERIMENTAL AND DESCRIPTION OF INTERPRETATION LEVELS

Headspace Gas Analysis

Wet cuttings samples were supplied in sealed cans and one ml. of the headspace gas from each of the cans was analysed for light hydrocarbons using gas chromatography. The results are shown in Table 1a. The canned samples were washed on 4mm, 2mm, 1mm and 0.125 mm sieves using temperate water to remove drilling mud, and thereafter dried at 35^{o}C.

Occluded gas analysis

A small amount of the 1-2 mm fraction was removed before drying and was crushed in water a gas-tight ball mill. One ml. of the headspace gas was then analysed by gas chromatography. Results are given in table 16.

Total Organic Carbon (TOC)

Picked cuttings of the various lithologies comprising over 10% in each sample were crushed in a centrifugal mill. Aliquots of the samples were then weighed into Leco crucibles and treated with hot 2N HCl to remove carbonate, and washed twice with distilled water to remove traces of HCl. The crucibles were then placed in a vacuum oven at 50^{o}C and evacuated to 20 mm Hg for 12 hrs. The total organic carbon (TOC) content of the dried samples was determined using a Leco EC12 carbon analyser.

Extractable Organic Matter (EOM)

Samples were selected for extraction on the basis of TOC results. Approximately 100 gm of powdered rock was extracted in a flow through system (Radke et al,, 1978, Anal. Chem. 49, 663-665) for 10 min. using dichloromethane (DCM) as solvent. The DCM used was of organic geochemical grade and blank analyses showed the occurrence of negligable amounts of contaminating hydrocarbons.

Activated copper filings were used to remove any free sulphur from the samples.

After extraction, the solvent was removed on a Buchi Rotavapor and transferred to a 50 ml flask. The remaining solvent was then evaporated and the amount of extractable organic matter (EOM) was determined.

Chromatographic Separation

The extractable organic matter (EOM) was separated into a saturated fraction, an aromatic fraction and a non- hydrocarbon fraction by MPLC with hexane as eluant (Radke et al., Anal. Chem., 1980). The hexane was reduced by evaporation using a Buchi Rotavapor and the sample was transferred to glassvials. Remaining hexane was removed by evaporation in a stream of nitrogen and the various fractions were weighed. Results are given in Tables III-VI.

Gas Chromatographic Analyses

The saturated and aromatic hydrocarbon fractions were each diluted with n-hexane and analysed on a HP 5730 A gas chromatograph, fitted with a 25 m OV101 fused silica capillary column and an automatic injection system. Hydrogen (0.7 ml/min.) was used as carrier gas and the injection was performed in the split mode (1:20).

Vitrinite Reflectance

Vitrinite reflectance measurements of the samples, taken at various intervals, were done at IKU. The samples were mounted in Bakelite resin blocks; care being taken during the setting of the plastic to avoid temperatures in excess of $100^{o}C$. The samples were then ground, initially on a diamond lap followed by two grades of corundum paper. All grinding and subsequent polishing stages in the preparation were carried out using isopropyl alcohol as lubricant, since water leads to the swelling and disintegration of the clay fraction of the samples.

Polishing of the samples was performed on Selvyt cloths using three grades of alumina, 5/20, 3/50 and Gamma, followed by careful cleaning of the surface.

Reflectance determinations were carried out on a Leitz M.P.V. microphotometer under oil immersion, R.I. 1.518 at a wavelength of 546 nm.

The surface of the polished block was searched by the operator for suitable areas of vitrinitic material in the sediment. The reflectance of the organic particle was determined relative to optical glass standards of known reflectance. Where possible, a minimum of twenty individual particles of vitrinite was measured, although in many cases this number could not be achieved.

The samples were also analysed in UV light, and the colour of the fluorescing material determined. Below, a scale comparing the vitrinite reflectance measurements and the fluorescence measurements is given.

VITRINITE REFLECTANCE R.AVER. 546 NM 1516	0.20		0.30	0.40	0.50	0.60	0.70	0.80	0.90		1.00	1.10
% CARBON CONTENT DAF.	57		62	70	73	76	79	80.5	82.5		84	85.5
LIPTINITE FLUOR NM	725	750	790	820	840		860	890		940		
EXC. 400 nm BAR. 530 nm colour	G	G/Y	Y	Y/O	L.O	M.O.		D.O.		O/R		R
zone	1	2	3	4	5	6		7		8		9

NOTE: Liptinite NM = Numerical measurements of overall spore colour and not peak fluorescence wavelength.

Relationship between liptinite fluorescence colour, vitrinite reflectance and carbon content is variable with depositional environment and catagenic history. The above is only a guide. Liptinite will often appear to process to deep orange colour and then fade rather than develop or O/R red shade. Termination of fluorescence is also variable.

Processing of Samples and Evaluation of Visual Kerogen

Crushed rock samples were treated with hydrochloric and hydrofluoric acids to remove the minerals. A series of microscopic slides contain strew mounts of the residue:

T-slide represents the total acid insoluble residue.
N-slide represents a screened residue (15 mesh).
O-slide contains palynodebris remaining after flotation ($ZnBr_2$) to remove heavy minerals.
X-slides contain oxidized residues, (oxidizing may be required to remove sapropel which embeds palynomorphs, or where high coalification prevents the identification of the various groups).

T and/or O slides are necessary to evaluate kerogen composition/-palynofacies which is closely related to sample lithology.

Screened or oxidized residues are normally required to concentrate the larger fragments, and to study palynomorphs (pollen, spores and dinoflagellates) and cuticles for paleodating and colour evaluation.

So far visual evaluation of kerogen has been undertaken from residues mounted in glycerine jelly, and studied by Leitz Dialux in normal light (halogene) using x10 and x63 objectives. By x63 magnification it is possible to distinguish single particles of diameters about 2 and, if required, to make a more refined classification of the screened residues (particles >15).

The colour evaluation is based on colour tones of spores and pollen (preferably) with supporting evidence from colour tones of other types of kerogen (woody material, cuticles and sapropel). These colours are dependant upon the maturity, but are also influenced by the paleoenvironment (lithology of the rock, oxidation and decay processes). The colours and the estimated colour index of an individual sample may therefore differ from those of the neighbouring samples. The techniques in visual kerogen studies are adopted from Staplin (1969) and Burgess (1974).

In interpretation of the maturity from the estimated colour indices we follow a general scheme that is calibrated against vitrinite reflectance values (R_0).

Ro	0.45	0.6	0.9	1.0	1.3
colour index	2-	2	2+	3-	3
Maturity intervals	Moderate mature	Mature (oil window)			Condensate window

Rock-Eval Pyrolysis

100 mg crushed sample was weighed into a platinum crucible the base and cover of which are made of sintered steel, and analysed on a Rock-Eval pyrolyser. Results are given in Table IX.

Pyrolysis Gas Chromatography (Py-GC)

Thermoextraction

20-30 mg of whole rock sample was placed in a boat shaped sample probe and swept with helium in a furnace type pyrolyser at 260°C for ca. 5 min. The outlet of the pyrolyser was directly connected to a splitter (30:1) and a fused silica capillary column. The thermoextracted material was trapped in a U-shaped section at the front of the column which was cooled in a liquid nitrogen bath.

The outlet of the splitter was directly connected to a FID detector. The course (progress) of the extraction could be followed by the detector response of the bulk extraction product (30:1) which was recorded as a broad peak. At the end of the thermoextraction (ca. 5 min.) the extracted material was injected onto the capillary column at room temperature (by removing the nitrogen bath) and analysed under the GC conditions given below.

Py-GC

20-30 mg of thermoextracted whole rock samples were programme pyrolysed in helium from 260°C-520°C at a rate of 35°C/min. in the furnace type pyrolyser described above. The pyrolysis product was injected and analysed as described for thermoextraction.

GC-conditions

Column: 25m OV-1 fused silica capillary column.

Carrier gas: Helium with inlet pressure 10 psi. Flow; ca. 1 ml/min.

Oven program: 50^oC-270^oC at 6^oC/min.

Gas chromatographic-mass spectrometric analysis

The analyses were performed on a VG 70-70H GC-MS/DS applying multiple ion detection (MID) with a scan cycle time of approximately 1 sec and an ion source temperature of 200^oC. Three samples were analysed for triterpanes (m/e 191) and steranes (m/e 217) in the saturated fractions, and for aromatic steranes (m/e 231, 239 and 253) in the aromatic fractions. The Varian Model 3700 GC was fitted with a 20m OV-1 fused silica column and the injections were performed in split mode. The temperature of the GC oven was programmed from 150^oC to 270^oC at 4^oC/min.

The ratios from the mass chromatograms were all calculated from the peak heights in the appropriate chromatograms.

Urea-adduction

Urea-adduction was performed on the same samples that were analysed on GC-MS. The sample containing 5 mg of n-alkanes was dissolved in 2 ml of n-hexane and 1 ml of acetone was added. A saturated solution of urea in methanol (1 ml) was then added dropwise. The solvent was removed (N_2) and the adduction step repeated twice. The white crystals were rinsed (3x5ml hexane) and the combined extract filtered (cotton wool plug covered with Al_2O_3), to afford a non-adduct. GC analyses were performed on the samples after the urea adduction, using the same conditions as for the other GC analyses.

RESULTS AND DISCUSSION

Canned samples covering the interval 1000 - 2882m were analysed and divided into nine zones on the basis of the gas analyses combined with the lithological descriptions.

Zone A; 1000 - 1360m.
Zone B; 1360 - 1720m.
Zone C; 1720 - 1904m.
Zone D; 1904 - 1949m.
Zone E; 1949 - 2030m.
Zone F; 2030 - 2408m.
Zone G; 2408 - 2534m.
Zone H; 2534 - 2660m.
Zone I; 2660 - 2882m.

Light Hydrocarbons

Where there was enough material available the canned samples were analysed for both headspace gas and cutting gas .

Zone A; 1000 - 1360m.
This zone consists of a mixture of sand and rock fragments. The abundance of headspace gas is good while hardly any samples contained enough material for cutting gas analyses. The headspace gas consisted mainly of C_1 with a small proportion of C_2 - C_4 compounds, totalling a very low wetness of the gas. The isobutane/n-butane ratio (iC_4/nC_4) is very variable, mainly because the quantities are close to the detection limits in most of the samples, thereby giving large uncertainities. The abundance of C_{5+} hydrocarbons is poor throughout the zone.

Zone B; 1360 - 1720m.
The upper 60m of this zone has a similar lithology to zone A, whilst an increasing amount of claystone and siltstone is recorded below 420m. With the introduction of siltstone/claystone in the samples, an increase in C_1 - C_4 hydrocarbons is recorded. The wetness of the gas is still very low. The most reliable change in the gas results is the very sharp increase in the iC_4/nC_4 ratio. The increase is so drastic that it might suggest bacteriological activity at this depth.

Zone C; 1720 - 1904m.
The lithology in this zone changes from almost 100% siltstone to a mixture of claystones of different colours. The abundance of the C_1 - C_4 hydrocarbons drops compared with zone B, while the wetness of the gas is still low. The iC_4/nC_4 ratio is high in the upper part of the zone but shows more erratic values towards the lower part of the zone.

Zone D; 1904 - 1949m.
This zone consists mainly of a mixture of light grey to green claystone and a dark grey to black shale. The claystone is similar to the one recorded for the zone above and could be cavings. The other possibility is of course that the two lithologies are interbedded. All the gas analyses results change drastically in this zone compared to the zones above. The abundance of both the C_1 - C_4 and the C_{5+}

hydrocarbons together with the wetness the gas increase sharply at the top of the zone. The wetness of the gas remains high throughout the zone while the abundance of both the C_1 - C_4 and the C_{5+} hydrocarbons drops towards the lower end of the zone. The iC_4/nC_4 ratio drops sharply and remains low throughout the zone.

Zone E; 1949 - 2030m.
The lithology of this zone changes compared with the zone above. The sample from 1949 - 1958m consists almost entirely of sand while the rest of the samples are a mixture of different shades of claystone (sometimes silty), and sandstone. The abundance of the C_1 - C_4 hydrocarbons is distinctly lower than that found for zone D, while the abundance of C_{5+} hydrocarbons does not show such a drastic drop. The wetness of the gas and the iC_4/nC_4 ratio are similar to those found for zone D.

Zone F; 2030 - 2408m.
Most of this zone consists of sand/sandstone with small percentages of greenish grey claystone and siltstone in parts. The abundance of C_1 - C_4 hydrocarbons decreases from the top of the zone down to 2200m then to increase again steadily to the lower end of the zone. The abundance of C_{5+} hydrocarbons is rather erratic from sample to sample, but shows a general decrease with increasing depth throughout the zone. A similar general decrease is also found for the wetness of the gas. The erratic values found from sample to sample could be due to the large variation in lithology,which is probably due to close interbedding.

Zone G; 2408 - 2534m.
This zone consists of a mixture of coal, sandstone and carbonaceous, dark grey claystone. The abundance of the C_1 - C_4 hydrocarbons is similar to that found in the lower part of zone F, while the abundance and the wetness of the gas show a steady decrease with increasing depth. The iC_4/nC_4 ratio shows a slight increase compared with zone F and is steady throughout the zone.

Zone H; 2534 - 2660m.
The lithology of this zone is similar to the zone above, i.e. a mixture of coal, sandstone and carbonaceous, dark grey claystone. The

abundance of C_1- C_4 hydrocarbons is similar to that found for zone G, while the abundance of C_{5+} hydrocarbons shows an increase with increasing depth. A slight increase with depth is also recorded for the wetness of the gas. The largest change is, however, associated with the iC_4/nC_4 ratio which is almost double that of zone G and remains high throughout the zone. This change could indicate bacteriological activity in these samples.

Zone I; The lithology of this zone is again a mixture of sandstone, coal and dark grey claystone. The percentage of claystone is, however, far higher than in both zones G and H. The abundance of C_1 - C_4 hydrocarbons shows a decrease with increasing depth while the abundance of C_{5+} hydrocarbons is poor but constant throughout the zone. The iC_4/nC_4 ratio drops to the level found for zone G while the wetness of the gas increases with increasing depth.

Total Organic Carbon

Organic carbon measurements were undertaken on all lithologies accounting for 10% or more of the sample, except sandstone.

Zone A; 1000 - 1360m.
This zone consists entirely of sand and rock fragments, and organic carbon measurements were not undertaken.

Zone B; 1360 - 1720m.
The upper 60m of this zone has a lithology similar to zone A, although some claystone was recorded from 1420m. From 1500m siltstone is recorded. The claystone shows a general increase in abundance with increasing depth and has an organic carbon content increasing from fair to good. The siltstone has a higher abundance of organic carbon than the claystone (mainly between 1 and 2%).

Zone C; 1720 - 1904m.
The lithology of zone C is similar to the lower part of zone B, i.e. a mixture of claystone and siltstone. The organic carbon values of the samples vary greatly from sample to sample and there is no general trend in the results.

Zone D; 1904 - 1949m.
This zone consists of a mixture of light grey claystone and dark grey shale. The claystone has organic carbon values of 0.6 - 1.7% while the shale has far higher values (5.7 - 11.9% i.e. a rich abundance of organic carbon).

Zone E; 1949 - 2030m.
This zone consists of a mixture of claystone lithologies with variable organic carbon values from 0.3 to 1%; i.e. a fair abundance of organic carbon. A dark grey shale/claystone is recorded towards the lower part of the zone. This lithology has a rich abundance of organic carbon.

Zone F; 2030 - 2408m.
Most of the zone consists of sand/sandstone with a small percentage of claystone and siltstone. The claystone has a fair abundance of organic carbon whilst in the main the siltstone has a good abundance.

Organic carbon measurements are only undertaken on a few samples.

Zone G; 2408 - 2534m.
This zone consists of a mixture of coal, sandstone and carbonaceous claystone. Organic carbon measurements are only undertaken on the claystone which is found to have a very high abundance of organic carbon.

Zone H; 2534 - 2660m.
As zone G.

Zone I; 2660 - 2882m.
The upper 90m of this zone is similar to zones G and H. From 2750m the dark grey carbonaceous claystone disappears, and a light brownish grey claystone is recorded. This has a good to rich abundance of organic carbon (0.9 - 2.9%).

Extraction and Chromatographic Separation

Zone A; 1000 - 1360m.
No samples from this zone were extracted.

Zone B; 1360 - 1720m.
No samples from this zone were extracted.

Zone C; 1720 - 1904m.
No samples from this zone were extracted.

Zone D; 1904 - 1949m.
Two samples from this zone were extracted (1913 - 1922m and 1931 - 1940m). The sample from 1913 - 1922m has a rich abundance of extractable hydrocarbons, while the sample from 1931 - 1940m has a good abundance of extractable hydrocarbons. When the extraction results are normalized to organic carbon, the extractability is far lower, indicating fair and poor extractabilities respectively for the two samples. This is due to the low maturity of the two samples. Both samples have a far higher extractability of non-hydrocarbons than of hydrocarbons which is also a sign of low maturity. The ratio of saturated/aromatic hydrocarbons is lower for the sample from 1931 - 1940m compared to the sample from 1913 - 1922m. This, together with the far lower extractability for the lowermost sample, indicates a difference in the kerogen of the two samples. The gas chromatograms of the saturated hydrocarbon fractions are similar. The isoprenoids and the cyclic compounds are very prominent in both samples indicating a low maturity. This is in good agreement with the high pristane/nC_{17}, low pristane/phytane ratios and high CPI value recorded. In these samples mainly geochemical fossils are recorded and this would imply that they are still in the early stage of diagenesis. The very low pristane/phytane ratio indicates a strongly reducing environment of deposition.

Zone E; 1949 - 2030m.
Two samples from this zone were extracted (1985 - 1994m and 2003 - 2012m) and both have a good abundance of extractable hydrocarbons. When normalized to organic carbon the values are far lower, indicating a poor extractability for both of the samples. This discrepancy between

the abundance of extractable hydrocarbons and the organic carbon normalized values is mainly due to the low maturity of the samples as in zone D. The saturated/aromatic hydrocarbon ratio decreases with increasing depth as in zone D. The gas chromatograms of the saturated hydrocarbon fraction of the two samples are similar to each other and to the samples from the zone above, i.e. immature with mainly geochemical fossils. The pristane/phytane ratio drops with increasing depth. This could indicate a decrease in the reductivity of the environment of deposition with increasing depth.

Zone F; 2030 - 2408m.
No samples from this zone were extracted.

Zone G; 2408 - 2534m.
Two samples from this zone were extracted (2471 - 2480m and 2525 - 2534m) and both found to have a rich abundance of extractable hydrocarbons. As with the samples above, both samples from this zone have a poor extractability when based on the organic carbon normalized extraction values. The saturated/aromatic hydrocarbon ratios of the two samples are very different. The uppermost sample has a large percentage of saturated compounds while the reverse is the case for the lowermost sample. The gas chromatograms of the saturated hydrocarbon fractions of the two samples are very similar, especially in the heavy molecular weight region. Both samples contain almost entirely cyclic compounds and n-alkanes in the nC_{23} - nC_{35} range. The medium molecular weight n-alkanes can hardly be detected for the sample from 2525 - 2534m. This indicates that mainly geochemical fossils from kerogen type III, are present.

Zone; H 2534 - 2660m.
One sample from this zone was extracted (2579 - 2588m) and found to have a rich abundance of extractable hydrocarbons but a low extractability based on the organic carbon normalized values as for the samples from the zones above. The ratio between the saturated/aromatic hydrocarbons is close to unity. The gas chromatogram of the saturated hydrocarbon fraction is similar to the sample from 2525 - 2534m, i.e. geochemical fossils from kerogen type III.

Zone I; 2660 - 2882m.

Three samples from this zone were extracted (2687 - 2696m, 2837 - 2846m and 2873 - 2882m). The sample from 2687 - 2696m was found to have a rich abundance of extractable hydrocarbons and a poor extractability based on the organic carbon normalized values, as for the samples from the zones above. The two lower samples have a good abundance of extractable hydrocarbons while the extractability based on the organic carbon normalized values are again poor. The saturated/aromatic hydrocarbon ratio is again close to unity for the two uppermost samples while the lowest sample has far more saturated hydrocarbons than aromatics. The gas chromatogram of the saturated hydrocarbon fractions of all the samples are different from those above in that there are hardly any steranes/triterpanes recorded. The high molecular weight n-alkanes are very prominent, while the medium molecular weight n-alkanes and the isoprenoids are relatively small in all samples. This is typical of gas chromatograms of hydrocarbons originating from immature terrestrial material.

Aromatic Hydrocarbons

The aromatic hydrocarbon gas chromatograms of these samples are dominated by a number of peaks above the methyl phenanthrenes (marked D). No compound types have been identified. In the sample lowest in the sequence, M-5215, (depth 2579 - 2588m), alkyl naphthalenes can be distinguished (A, B, C). In the other two samples the alkyl naphthalenes are very minor contributions. Since these samples are of low maturity it is possible that many of the unidentified compounds are hydro-aromatics, i.e. partially saturated compounds, which are seen in very immature samples before alkyl naphthalenes are generated.

GC-analyses of branced/cyclic saturated hydrocarbons after urea-adduction

Three samples (M-5143, M-5203 and M-5215) were treated by urea adduction and the branched/cyclic fraction was analysed by gas chromatography.

The GC-traces of the branched/cyclic (B/C) fractions of two of the samples contain one major peak in the late-eluting part of the chromatograms. The components eluting after this peak are steranes and triterpanes that have been accounted for in the GC-MS discussion and are not to be mentioned here.

In the early part of the chromatograms where the acyclic isoprenoids elute, pristane (Pr) and phytane (Ph) are the major peaks. The samples also contain a certain amount of the C_{18} - isoprenoid.

The Pr/Ph ratio has been determined for two of the samples from the GC of the saturated fractions (Table 7). This ratio and the Pr/C_{17} ratio was not calculated in M-5215, due to lack of n-alkanes in this range. The urea-adduction made it clear which peaks are the isoprenoids, and the Pr/Ph - ratio was determined to be 5.0. This is approximately the same as for M-5203.

The amount of triterpanes/steranes relative to acyclic isoprenoids seems to be approximately the same in all samples, possibly slightly lower in M-5143.

The samples, particularly M-5143, contain also some other major peaks in the early eluting part of the B/C chromatograms. GC-MS of one of the samples revealed most of the peaks to represent common plasticizers, such as tri-n-butylphosphate (**) and phthalates (*), as indicated on the B/C chromatograms, due to the samples being contaminated.

Analyses in Transmitted Light. Dispersed Organic Matter

The interval from 1877m to 2882m was investigated on the basis of 15 samples of washed ditch cuttings. All the acid insoluble residues were evaluated as dominated by material from terrestrial sources, but are of different relative compositions. Caved material and lignites (if added) cannot be distinguished from indigenous material on the basis of maturity (colour index).

Interval 1877m to 2480m.	Immature. Cuticles, palynomorphs and woody material 10 - 20% true amorphous.
Interval 2498m to 2588m.	Immature. Woody material, mainly vitrinite dominates. Early Jurassic palynomorphs.
Interval 2660m to 2882m.	Immature. Woody material and some cuticles. Triassic spores and pollen.

The entire well is immature but there is a slight increase from index 1/1+ or 1+, to 1+/2- in the lowest interval.

Sample description.

Sample M-5136 (1877m). Cuticles dominate this residue. They are recorded together with woody material, cysts/and pollen in an amorphous matrix. Two cyst assemblages seem present and like the pollen grains they are of Tertiary age. The palynomorphs are well preserved. Neither caving nor presence of lignite as mud additives can be excluded.

Colour index: 1/1+ to 1+.

Samples M-5140 (1913m) and M-5141 (1922m). Pyritic aggregates of cuticular woody degraded material. Some true amorphous material was observed. Fairly well preserved dinoflagellate cysts and Tasmanites.
The presence of Middle to Early Jurassic pollen at 1922m may imply reworking. If in place this residue is dominated by material from caved lithologies.

Colour index: 1+

Sample M-5143 (1940m). The residue resembles M-5141 (1922m) above, but also includes Tertiary pollen, either caved or from mud additives. A possible explanation is that we are dealing with a poor Jurassic lithology polluted due to the drilling process.

Colour index: 1+

Sample M-5149 (1994m). The main constituents are cuticles and vitrinite as above but with numerous bisaccate pollen grains. Micrhystridium is noted. About 20% true amorphous material.

Colour index: 1+

Sample M-5151 (2012m). Pyritic aggregates of degraded cuticles, woody and amorphous material. Abundant bisaccates, spores and tasmanitids. Minute spherical algal or fungal spores. The preservation is poor to fair.

Colour index: 1/1+.

Sample M-5203 (2480m). Cuticles and woody material dominate a residue in which fairly well preserved pollen grains are the dominant palynomorphs.

Colour index: 1/1+.

Samples M-5205 (2498m), M-5209 (2534m) and M-5215 (2588m). Woody material (vitrinite as coaly particles) dominates, with subordinate spores and cuticular fragments.

Colour index: 1/1+

Samples M-5223 (2660m) to M-5247 (2882m). Woody material, (vitrinite as coaly particles) dominates. Cuticles and spores are subordinate but more frequent in the lowest part of the interval. The spores are of Late Triassic aspect or possibly Earliest Jurassic in M-5223.

Colour index: 1+/2-, 1/1+.

Examination in Reflected Light

Fifteen samples were taken from the whole well at approximately even intervals. These were examined under reflected light and are described below. The top part of the well yielded only small amounts of measurable material.

Sample M-5094, 1420 - 1440m: Sandstone with shale, Ro = 0.56 (1)
The sandstone is barren. There is a trace of shale but only one measurable piece of vitrinite. This is thought to be reworked. There is no fluorescence.

Sample M-5101, 1530 - 1540m: Sandstone and shale, Ro = 0.35 (8)
The sandstone is virtually barren of organic material while the shale has a low to moderate content, dominantly inertinite or reworked vitrinite. Most of the indigenous vitrinite is particulate and only a few stringers were located. There is a moderate to heavy, localised bitumen staining. There is no fluorescence.

Sample M-5107; 1590 - 1600m: Shale, Ro = 0.34 (19)
The sample has a moderate to high organic content which is dominated by vitrinite most of which is primary. There is some evidence of additive/-contaminant coal particles. There is a moderate bitumen staining and bitumen wisp content but the presence of iron staining may lead to an overestimation of this. Fluorescence shows green/yellow and yellow spores.

Sample M-5121; 1730 - 1740m: Claystone and shale, Ro = 0.40 (6)
The claystone is almost barren and the shale has a low organic content. Vitrinite is most abundant followed by inertinite. There is some bitumen staining. Fluorescence is seen from organic layers of microfossils (dinoflagellates?) and one yellow/orange spore.

Sample M-5133, 1841 - 1850m: Claystone/siltstone, Ro = 0.36 (7)
The sample contains only loose organic fragments of lignitic nature. These could be contamination. There is a trace of bitumen staining in some silt cuttings. There is a trace of yellow/orange fluorescence from spores.

Sample M-5143, 1931 - 1940m: Claystone, shale and lignite, Ro = 0.35 (2) and 0.57 (4)
There is a high content of lignite (additive?). The claystone has a low organic content whilst the shale has a high content but it is mainly bituminite and very degraded vitrinite. Much of the vitrinite occurs as stringers but they are very gnarled and bitumen stained and cannot be measured. There is green carbonate fluorescence, green/yellow resin fluorescence and yellow/orange fluorescence from spore fragments.

Sample M-5151, 2003 - 2012m. Sandstone and claystone, Ro = 0.39 (7)
The sandstone is barren but the claystone has a moderate to high organic content. Vitrinite and bituminite dominate and occur closely intimate with the mineral matrix and are very pitted and gnarled making measurement difficult. There is weak mineral fluorescence and green/yellow and yellow/orange fluorescence from spores.

Sample M-5162, 2101 - 2111m: Sandstone and shale, Ro = 0.37 (3)
There is a high lignite content. The shale contains a trace or organic material. The presence of so much lignite may mean that the result is too low. There is a trace of yellow/orange fluorescence from spores.

Sample M-5181; 2273 - 2282m: Sandstone and shale, Ro = 0.45 (20)
There is a very high content of lignite additive. The shale has a moderate organic content with almost equal proportions of inertinite and vitrinite. There are some bitumen wisps in the shale. There are a few loose coal fragments. Green/yellow and yellow fluorescence is seen from resins and possibly yellow fluorescence from spores.

Sample M-5199, 2435 - 2444m: Sandstone, shale and coal, Ro = 0.44 (20)
The sandstone is virtually barren. The shale has a moderate to high organic content which is dominantly vitrinite in the rich cuttings but mainly inertinite in the more clayey areas. There is yellow fluorescence from spores in the coal and a low content of yellow/orange spores in the sediment.

Sample M-5205, 2489 - 2493m: Sandstone, claystone and coal, Ro = 0.44 (21)
The sample is rich in organic material dominantly vitrinite. Some of the clay has heavy bitumen staining. There is more organic material in the sandstone than usual. There is a trace of spores fluorescing Yellow/orange.

Sample M-5213, 2561 - 2570m: Sandstone, claystone and coal, Ro = 0.43 (20)
The sample has a high organic content dominantly vitrinite. There is a trace of bitumen staining and a few bitumen wisps. The vitrinite is often badly pitted. There is yellow/orange fluorescence from spores.

Sample M-5223, 2651 - 2660m: Claystone and sandstone, Ro = 0.41 (21)
The claystone is very rich in organic material (carbargillitic?) of very variable composition - some areas are dominantly vitrinite and some are dominantly inertinite. Overall, vitrinite is most abundant. There is some bitumen staining. There is a trace of spores fluorescing green/-yellow and yellow.

Sample M-5233, 2741 - 2750m: Claystone and sandstone, Ro = 0.44 (20)
Some of the claystone is very rich - dominantly vitrinite. Some areas have a moderate content and there the dominant component is inertinite. The vitrinite appears very dull and is often pitted (Ro too low?). There is a low content of spores fluorescing yellow/orange.

Sample M-5247, 2873 - 2882m: Sandstone and shale, Ro = 0.50 (17)
The sandstone is almost barren. The shale has a moderate organic content with approximately equal amounts of vitrinite and inertinite. There is some lignite additive. It is difficult to assess the extent of bitumen staining because the sample also shows haematite stains. There is a wide distribution of values. Fluorescence shows green/yellow resins and possible yellow/orange spores.

Rock-Eval Pyrolyses

Zone A; 1000 - 1360m.
No samples from this zone were pyrolysed.

Zone B; 1360 - 1720m.
No samples from this zone were pyrolysed.

Zone C; 1720 - 1904m.
A total of seven samples from this zone were pyrolysed on a Rock-Eval instrument. All the analysed samples have low T_{max} values indicating immaturity. One of the samples, 1886 - 1895m, has a low/moderate hydrogen index and a high oxygen index indicating the sample to contain kerogen type III while the rest of the samples have low hydrogen indices and high oxygen indices indicating the samples to contain kerogen type IV, i.e. inertinite and reworked material. The whole zone has a poor petroleum potential.

Zone D; 1904 - 1949m.
A total of seven samples from this zone were analysed on a Rock-Eval instrument. The claystone from the zone has similar values to zone C while the shale has high hydrogen and low oxygen indices. The hydrogen indices vary somewhat indicating some to be of kerogen type I/II, others of kerogen type II possibly with some mixture of kerogen type II and III in parts. The T_{max} is low on all the samples showing them to be immature. The petroleum potential is high for all the shale samples. The extremely low production indices recorded for all the samples show that they do not contain any free hydrocarbons. This is in good agreement with the extraction results.

Zone E; 1949 - 2030m.
A total of six samples from this zone were pyrolysed on a Rock-Eval instrument. The dark grey claystones from 1994 - 2003m and 2003 - 2012m have moderate hydrogen and oxygen indices indicating a mixture of type II/III kerogen while the rest of the samples have values as found in zone C, i.e. kerogen type IV. The petroleum potential for the dark claystone samples is good/rich while it is poor for all the other samples. The low T_{max} values indicate the whole zone to be immature.

Zone F; 2030 - 2408m.

One sample, 2075 - 2084m was pyrolysed on a Rock-Eval instrument. The samples has no S_2 peak i.e. its kerogen is not capable of producing any hydrocarbons.

Zone G; 2408 - 2534m.

A total of five samples from this zone were pyrolysed on a Rock-Eval instrument. The samples have moderate hydrogen and low oxygen indices indicating the samples to contain kerogen type III. The T_{max} is low for all the samples showing the whole zone to be immature. All of the analysed samples have a rich petroleum potential.

Zone H; 2534m - 2660m.

A total of four samples from this zone were pyrolysed on a Rock-Eval instrument and found to have similar values to those from zone G, i.e. immature kerogen type III with a rich petroleum potential.

Zone I; 2660 - 2882m.

A total of nine samples from this zone were pyrolysed on a Rock-Eval instrument. The samples down to 2750m have similar values to those from zones G and H, while most of the samples below 2750m have lower hydrogen indices indicating a mixture of kerogen type III and IV. The petroleum potential drops for these samples to a poor/fair potential.

Thermoextraction

Fourteen whole rock samples were thermoextracted as described in the experimental section. The GC traces of the thermoextracted material (free hydrocarbons) are all very similar and three traces are selected as representative examples.

M-5140 (1913m), M-5141 (1922m) and M-5143 (1940m). The GC traces show an n-alkane homology ranging from C_7 to ca. C_{10}-C_{13}, indicating that only low molecular weight hydrocarbons are present in the samples. This is in accordance with the low maturity of the samples, i.e. very little free hydrocarbons have been formed. The difference in the traces reflects variations in sample size and instrument sensitivity rather than differences in the composition of the thermoextracted material.

Pyrolysis Gas Chromatography (Py-GC)

Fourteen thermoextracted whole rock samples were analysed by Py-GC. The instrumental conditions are discussed in the experimental section. The results are discussed below. Based on retention and mass spectrometric (MS) data from other kerogens, peaks in the pyrograms are tentatively identified. The numbered peaks are n-alkene/n-alkane doublets of the corresponding carbon number. The n-alkenes have the shorter retention time. T=toluene; X= m+p-xylenes. The pyrograms give a gas chromatographic picture of the S_2 peak in Rock-Eval pyrolysis.

M-5136 (1877m) The pyrogram shows an n-alkene/n-alkane homology ranging from C_7 to C_{18}. The abundance of aromatics is very high and the short range of the aliphatic homology indicates a low content of lipid material. Generally the pyrogram shows a type III kerogen fingerprint.

M-5140 (1913m) The pyrogram shows an n-alkene/n-alkane homology ranging from C_7 to C_{27}. The abundance of aliphatics is higher than in M-5136. Generally the pyrogram shows a type II kerogen fingerprint.

M-5141 and M-5143 (1922m and 1940m) The pyrograms of these two samples are very similar showing an n-alkene/n-alkane homology ranging from C_7 to C_{27} with a moderate content of aromatics, i.e. a type II kerogen.

M-5149 (1994m) The pyrogram of this sample shows an n-alkene/n-alkane homology ranging from C_7 to C_{19} (quite similar to M-5136). However, the abundance of aromatics is lower in M-5149 and it may be classified as a mixed type III/II kerogen.

M-5151 (2012m) The pyrogram of this sample is very similar to M-5141 and M-5143, i.e. type II kerogen.

M-5203 (2480m) The pyrogram shows an n-alkene/n-alkane homology ranging from C_7 to C_{30}. The aliphatic homology has a maximum around C_{19} indicating an input of plant waxes. The abundance of aromatics is relatively high, i.e. a mixed type III/II kerogen.

M-5205 (2498m) The pyrogram of this sample is very similar to M-5203, i.e. a mixed type III/II kerogen.

M-5209 (2534m), M-5223 (2660m), M-5225 (2678m), M-5229 (2714m), M-5233 (2750m) and M-5247 (2882m).
The pyrograms of these six samples are overall very similar having an n-alkene/n-alkane homology ranging from C_7 to C_{31}. The maximum in the C_{21} - C_{25} region indicates an input of plant waxes. The abundance of aromatics is relatively high, i.e. a mixed type III/II kerogen.

GC-MS analyses of $C_{15}+$ saturated hydrocarbons

Three samples from two different zones (M-5143 and M-5203, M-5251) were analysed for their content of triterpanes and steranes, as given by the mass chromatograms of m/e 191 and m/e 217, respectively.

The triterpane chromatograms (m/e 191) show the three samples to be of low maturity. The extended hopanes ($>C_{31}$) have the possibility of isomerisation at C-22. The 22R-configuration is preferred biologically, but is lost in favour of a mixture of 22R and 22S (60% 22S/22R - 22S) in more mature samples. The analysed samples have approximately 10% 22S (Table 11) which suggests low maturity.

The amount of 17 β (H), 21β (H)-hopanes and 17 β(H), 21 β (H)-hopanes (moretanes) decreases with increasing maturity, compared to the amount of the ubiquitous 17 α (H), 21 β (H)-hopanes. The two deepest samples contain approximately 42-43% ββ -hopanes, whilst M-5143 contains 40% ββ. This difference could be used to imply that the latter sample is somewhat less mature than the others.

The ratio of βα/αβ -hopanes is nearly the same in all three samples (Table 11).

The sterane mass chromatograms (m/e 217) reveal a greater difference between the samples. Sample M-5143 contains nearly 100% of the biologically preferred 20R-configuration of the 5 α(H), 14α (H), 17α(H)-steranes. Only a trace of 5α (H), 14β (H), 17 β (H)-steranes and hardly any rearranged steranes could be detetced. This all strongly indicates the samples to be immature.

The chromatograms of the two deepest samples show a much more complex pattern of peaks than that of M-5143. This complexity made it difficult to calculate any ratios for the chromatograms. It can however, be seen that the amount of rearranged steranes is low.

These results indicate that the three samples can be divided into two groups according to the zone they are derived from. They are all of approximately similar maturity.

GC-MS analyses of aromatic steranes

The three samples analysed for triterpanes and steranes were also analysed for mono-aromatic steranes (m/e 239 and m/e 258) and tri-aromatic steranes (m/e 231). Again a difference between the two groups of samples was found - more complexity in the deepest samples compared to M-5143. The only ratio calculated from these chromatograms is the amount of side chain cracking for the monoaromatic steranes (m/e 253 and m/e 239). This cracking is thought to be due to increased maturity (McKenzie et. al., 1981; Shi Ji-Yang et. al., 1982), and the results in Table 11 therefore indicate a somewhat lower maturity for M-5143.

CONCLUSIONS

The maturity of the analysed samples from well 6507/11-2 is based mainly on vitrinite reflectance, spore fluorescence, kerogen colour in transmitted light and T_{max} values from Rock-Eval analysis. The richness of the samples is based on TOC, Rock-Eval pyrolysis with additional evidence being supplied from light hydrocarbon concentrations and the abundance of extractable hydrocarbons. Source rock quality is based mostly on Rock-Eval pyrolysis with additional evidence coming from visual kerogen examination and from the saturated hydrocarbon gas chromatograms, and from pyrolysis gas chromatography.

Zone A; 1000 - 1360m.
This zone consists mainly of sand and rock fragments and does not have any source rock potential.

Zone B; 1360 - 1720m.
The upper 60m of this zone is as zone A, while the claystone/siltstone in the rest of the zone is found to be immature with no source rock potential.

Zone C; 1720 - 1904m.
The lithology of this zone is almost 100% siltstone which contains mainly kerogen type IV. The whole zone is immature with no source rock potential.

Zone D; 1904 - 1949m.
This zone consists of a mixture of light grey claystone and a dark grey shale. The claystone might be cavings from zone C, while the dark grey shale has a high hydrogen index indicating kerogen type I or a mixture of type I/II. This is in relatively good agreement with the visual kerogen examination which shows the samples mainly to consist of cuticles, algae and amorphous kerogen. Based on the various analyses, the shale is found to be immature with a rich potential as a source rock for paraffinic oil and gas.

Zone E; 1949 - 2030m.
This zone consists mainly of different types of claystone. Most of the samples consist of kerogen type IV or a mixture of type III/IV kerogen. The dark claystone, 1994 - 2012m, has a mixture of type II/III kerogen.

Based on the different analyses the whole zone is found to be immature. Most of the zone does not have any source rock potential, while the dark claystone, 1994 - 2030m has a good potential as a source rock for gas and possibly some oil.

Zone F; 2030 - 2408m.
Most of this zone consists of sand/sandstone with no source rock potential.

Zone G; 2408 - 2534m.
The whole of this zone consists of a mixture of dark claystone, sandstone and coal. Based on the various analyses, the claystone and the coal are found to be immature with a rich potential as source rocks for gas.

Zone H; 2534 - 2660m.
This zone is very similar to zone G, i.e. immature with a rich potential as a source rock for gas.

Zone I; 2660 - 2882m.
The upper 90m of this zone is similar to the two zones above, i.e. immature with a rich potential as a source rock for gas. From 2750m the kerogen quality changes and the lower part of the zone is immature with a fair potential as a source rock for gas.

TABLE I a.

CONCENTRATION (ul Gas / kg Rock) OF C1 - C7 HYDROCARBONS IN HEADSPACE.

KU o.	DEPTH (m)	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET- NESS (%)	iC4 --- nC4
5073	1020	10718	10	10	2	9	76	10749	31	.29	.25
5074	1040	31670	16	32	11	8	59	31736	66	.21	1.34
5075	1060	14539	8	5	4	4	30	14560	21	.14	.99
5076	1080	20853	5	31	5	7	70	20901	48	.23	.75
5077	1100	12039	5	9	2	2	33	12057	18	.15	1.19
5078	1120	10180	5	3			6	10188	8	.08	
5079	1140	12976	7	23	5		62	13012	36	.27	
5080	1160	17043	9	4	6	8	44	17070	27	.16	.66
5081	1180	10873	4	5		3	20	10885	12	.11	.00
5082	1200	15407	6	8		5	34	15426	19	.12	.00
5083	1220	8948	4	5		2	11	8959	11	.12	.00
5084	1240	5364	2	2		1	4	5370	5	.10	.00
5085	1260	15833		7			9	15841	7	.05	
5086	1280	12064	7	7			8	12078	14	.12	
5087	1300	13421	11	14	3	2	8	13451	30	.22	1.61
5088	1320	14532	9	10	2	2	8	14554	22	.15	1.09
5089	1340	12633	9	11	2		4	12654	21	.17	
5090	1360	18276	10	18	3		6	18307	31	.17	—
5091	1380	14801	18	24	3	5	49	14850	50	.33	.61
5092	1400	46296	31	74	15	10	61	46426	130	.28	1.48
5093	1420	98357	91	163	54	18	77	98684	326	.33	3.07
5094	1440	75190	143	198	102	20	168	75652	462	.61	5.16
5095	1460	5311	9	9	5	1	7	5335	24	.45	6.57
5096	1480	43311	75	75	49	8	38	43517	206	.47	6.06
5097	1500	35448	36	49	22	5	33	35561	113	.32	4.42

TABLE I a.

CONCENTRATION (ul Gas / kg Rock) OF C1 - C7 HYDROCARBONS IN HEADSPACE.

U r.	DEPTH (m)	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4 / nC4
098	1510	47027	43	69	42	7	38	47188	161	.34	6.19
099	1520	43088	49	90	57	5	30	43289	202	.47	1.53
101	1540	53464	69	100	55	7	39	53694	230	.43	7.47
103	1560	44776	63	102	48	8	35	44996	220	.49	5.91
105	1580	141782	202	335	113	21	78	142453	671	.47	5.32
107	1600	37255	81	123	32	6	6	37497	242	.65	4.90
109	1620	21646	70	86	19	4	7	21826	180	.82	4.33
111	1640	111901	260	321	75	18	21	112574	673	.60	4.13
113	1660	114211	265	297	70	14	19	114857	646	.56	4.91
115	1680	26759	67	87	39	6	16	26959	200	.74	6.61
117	1700	12919	77	50	20	3	9	13069	150	1.15	5.96
119	1720	7466	32	23	8	3	7	7532	66	.88	3.27
121	1740	13607	255	26	7	3	9	13899	291	2.10	2.37
123	1760	10497	286	9	2	1	3	10795	298	2.76	1.92
125	1778	5813	48	18	4	5	2	5888	74	1.26	.76
127	1796	257	30	2				290	33	11.21	[illegible]
129	1814	8784	266	10				9061	276	3.05	[illegible]
131	1832	13643	947	58	9	4		14660	1017	6.94	2.43
132	1841	427	35	4	1	1	1	467	41	8.69	1.08
133	1850	6648	495	59	29	47	453	7278	630	8.65	.61
134	1859	3485	244	238	178	336	2298	4480	995	22.22	.53
135	1886	2802	200	586	629	1169	4529	5387	2584	47.98	.54
137	1886	7446	833	8410	6981	12827	28714	36497	29051	79.60	.54
139	1904	28275	5976	15376	2375	3826	1288	55827	27552	49.35	.62
141	1922	39913	7049	16543	3225	5413	2795	72142	32230	44.68	.60

TABLE I a.

CONCENTRATION (ul Gas / kg Rock) OF C1 - C7 HYDROCARBONS IN HEADSPACE.

U.	DEPTH (m)	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4 --- nC4
143	1940	15748	3001	8411	2024	3352	2652	32537	16789	51.60	.60
145	1958	12258	2214	5054	1332	2313	2030	23171	10913	47.10	.58
147	1976	4633	1187	3169	784	1349	706	11122	6489	58.34	.58
149	1994	2898	708	1967	458	780	409	6810	3913	57.45	.59
151	2012	2287	983	3182	791	1398	1088	8641	6354	73.54	.57
153	2030	3708	890	1851	469	805	645	7724	4016	51.99	.58
155	2048	663	100	263	81	142	112	1250	587	46.99	.57
157	2066	6822	605	759	166	277	282	8629	1807	20.94	.60
159	2084	2596	304	491	119	205	186	3715	1119	30.12	.58
.61	2102	12160	1015	1223	337	548	642	15282	3122	20.43	.61
.63	2120	11960	1712	2153	556	953	1204	17333	5373	31.00	.58
.65	2138	739	253	937	285	490	293	2704	1965	72.68	.58
67	2156	153	50	96	37	60	74	396	243	61.40	.61
69	2174	618	193	113	83	68	103	1075	457	42.50	1.23
71	2192	523	180	105	117	42	102	967	444	45.91	2.74
73	2210	4581	1493	1137	595	580	682	8386	3805	45.37	1.02
75	2228	1176	400	528	227	339	409	2672	1496	55.97	.67
77	2246	16455	4524	294	132	37	35	21443	4987	23.26	3.59
79	2264	5706	493	312	135	179	151	6825	1119	16.39	.75
81	2282	19345	3978	4236	1249	2080	1766	30886	11541	37.37	.60
83	2300	12959	816	493	126	159	94	14554	1594	10.95	.80
85	2318	1987	120	38	11	14	15	2170	183	8.45	.80
87	2336	17338	915	75	20	24	30	18373	1035	5.63	.86
89	2354	25168	1392	165	39	52	57	26816	1648	6.15	.73
91	2372	31960	1646	140	18	20	15	33784	1824	5.40	.92

TABLE I a.

CONCENTRATION (ul Gas / kg Rock) OF C1 - C7 HYDROCARBONS IN HEADSPACE.

U	DEPTH (m)	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4 / nC4
193	2390	543	16	8	2	3	2	571	29	5.01	.71
195	2408	981	40	14	6	5	6	1047	66	6.34	1.18
197	2426	17658	289	55	14	20	19	18037	379	2.10	.70
199	2444	1449	15	2	1	1	1	1467	18	1.24	1.05
201	2462	21037	45	10	9	5	11	21105	69	.33	1.86
203	2480	141882	844	160	49	69	156	143005	1123	.79	.71
205	2498	25376	732	83	15	18	26	26224	848	3.23	.81
207	2516	13981	370	61	15	20	29	14447	466	3.22	.74
209	2534	12899	281	18	5	4	5	13207	308	2.33	1.21
211	2552	5415	86	11	3	1	1	5515	100	1.81	2.22
213	2570	5003	84	7	2	1		5096	93	1.83	2.38
215	2588	12539	278	38	7	6	6	12868	329	2.56	1.14
217	2606	3688	193	4	2	2	1	3889	201	5.17	1.04
219	2624	6808	238	30	5	6	7	7087	279	3.93	.90
221	2642	3135	75	20	5	6	6	3242	107	3.29	.82
223	2660	13031	277	56	13	5	6	13382	351	2.63	2.41
225	2678	11709	372	103	34	36	52	12255	547	4.46	.95
227	2696	7351	416	54	9	17	12	7847	496	6.33	.50
229	2714	738	52	11	4	5	11	810	72	8.89	.80
231	2732	6777	302	56	17	18	30	7171	394	5.49	.93
233	2750	6788	309	54	11	8	6	7170	382	5.33	1.33
235	2768	8108	341	52	12	10	8	8523	415	4.87	1.18
237	2786	4957	174	33	8	8	7	5180	223	4.31	1.01
239	2804	17010	688	150	36	40	37	17924	914	5.10	.90
241	2828	2773	123	42	14	19	19	2971	198	6.67	.73

TABLE I a.

CONCENTRATION (ul Gas / kg Rock) OF C1 - C7 HYDROCARBONS IN HEADSPACE.

…U ….	DEPTH (m)	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET- NESS (%)	iC4 --- nC4
…243	2846	3395	239	73	19	27	38	3754	359	9.56	.71
…245	2864	1451	117	36	11	13	25	1629	178	10.93	.87
…247	2882	536	35	16	5	6		599	63	10.46	.83

TABLE I b.

CONCENTRATION (ul Gas / kg Rock) OF C1 - C7 HYDROCARBONS IN CUTTINGS.

KU No.	DEPTH (m)	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4 / nC4
5073	1020	507	507	507	507		1014	2028	1521	75.00	
5074	1040	NOT ENOUGH MATERIAL									
5075	1060	NOT ENOUGH MATERIAL									
5076	1080	NOT ENOUGH MATERIAL									
5077	1100	NOT ENOUGH MATERIAL									
5078	1120	NOT ENOUGH MATERIAL									
5079	1140	NOT ENOUGH MATERIAL									
5080	1160	NOT ENOUGH MATERIAL									
5081	1180	NOT ENOUGH MATERIAL									
5082	1200	NOT ENOUGH MATERIAL									
5083	1220	215	68	203	89	172	364	747	532	71.19	.52
5084	1240	NOT ENOUGH MATERIAL									
5085	1260	380	125	276	143	327	1560	1252	872	69.61	.44
5086	1280	NOT ENOUGH MATERIAL									
5087	1300	324	24	19	17	87	27	471	147	31.15	.20
5088	1320	NOT ENOUGH MATERIAL									
5089	1340	243	8	3	3	51	275	308	65	21.11	.06
5090	1360	534	23	9	7	67	13	640	105	16.48	.10
5091	1380	14			7			20	7	32.69	
5092	1400	3		1	4		4	9	5	62.68	
5093	1420	NOT ENOUGH MATERIAL									
5094	1440	NOT ENOUGH MATERIAL									
5095	1460	NOT ENOUGH MATERIAL									
5096	1480	NOT ENOUGH MATERIAL									
5097	1500	NOT ENOUGH MATERIAL									

TABLE I b.

CONCENTRATION (ul Gas / kg Rock) OF C1 - C7 HYDROCARBONS IN CUTTINGS.

U .	DEPTH (m)	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4 --- nC4
098	1510										
099	1520	361	24	20	14			420	59	13.99	
101	1540										
103	1560	665	47	26		11	72	749	84	11.26	.00
105	1580	749	57	31		17	184	854	105	12.28	.00
107	1600	1626	48	88	56	36	142	1854	228	12.31	1.53
109	1620	504	29	50	31	22	117	636	132	20.80	1.41
111	1640	47	4	3			7	54	7	12.10	
113	1660	165	10	10	6		17	191	25	13.35	
115	1680	93	3	5	5	2	297	108	15	13.62	3.18
117	1700	75	5	5	4	1	14	90	15	16.82	2.52
119	1720	292	27	22	10	13	97	365	73	19.93	.75
121	1740	222	19	6			18	246	24	9.87	
123	1760	67	4	2			12	73	6	7.74	
125	1778	16						16		.00	
127	1796	O P E N		L I D .							
129	1814	41	6		6			52	12	22.22	
131	1832										
132	1841	122	36	20	14	16	25	208	86	41.38	.90
133	1850	O P E N		L I D .							
134	1859	O P E N		L I D . .							
135	1886	56	16	8	15	41	3244	136	79	58.49	.36
137	1886	57	27	133	298	763	16106	1278	1221	95.53	.39
139	1904	194	646	8682	5596	11744	16416	26862	26668	99.28	.48
141	1922	1101	1933	19713	11666	23202	23835	57614	56514	98.09	.50

TABLE I b.

CONCENTRATION (ul Gas / kg Rock) OF C1 - C7 HYDROCARBONS IN CUTTINGS.

U .	DEPTH (m)	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET- NESS (%)	iC4 --- nC4
143	1940	664	1522	17106	11790	23934	13960	55016	54353	98.79	.49
145	1958	299	587	6203	4875	9940	6187	21905	21606	98.63	.49
147	1976	220	550	6343	5113	10667	7528	22893	22673	99.04	.48
149	1994	391	743	7809	6096	12405	7394	27445	27053	98.57	.49
151	2012	95	221	2991	2288	4960	3150	10554	10460	99.10	.46
153	2030	396	739	5231	3853	7913	7218	18131	17736	97.82	.49
155	2048	551	473	4839	6384	14468	12998	26716	26165	97.94	.44
157	2066	243	244	2725	2995	6259	4653	12465	12223	98.05	.48
159	2084	195	307	3153	3744	7893	6083	15292	15097	98.73	.47
161	2102	223	270	1984	2569	5735	5001	10781	10558	97.93	.45
163	2120	17	20	121	77	135	97	370	353	95.46	.57
165	2138	7	5	50	51	102	57	214	207	96.88	.50
167	2156	377	330	1569	2430	5255	8434	9961	9583	96.21	.46
169	2174	2359	216	406	693	1102	3613	4776	2416	50.60	.63
171	2192	407	416	773	1398	2042	8580	5035	4629	91.93	.68
173	2210	236	375	1614	1726	2879	5239	6830	6594	96.55	.60
175	2228	71	551	3145	2620	4825	6735	11214	11142	99.37	.54
177	2246	5337	14651	4619	3552	1546	1798	29705	24368	82.03	2.30
179	2264	963	1718	2900	1735	3079	3431	10395	9432	90.74	.56
181	2282	162	505	2724	2098	4322	5472	9811	9649	98.35	.49
183	2300	169	527	2843	2190	4511	5712	10240	10071	98.35	.49
185	2318	6056	4069	2414	815	1130	777	14484	8428	58.19	.72
187	2336	13577	7219	2058	757	965	721	24575	10998	44.75	.78
189	2354	5153	4302	1990	766	1080	764	13291	8138	61.23	.71
191	2372	12358	9402	1740	446	285	252	24231	11873	49.00	1.56

TABLE I b.

CONCENTRATION (ul Gas / kg Rock) OF C1 - C7 HYDROCARBONS IN CUTTINGS.

U .	DEPTH (m)	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4 --- nC4
193	2390	7229	3360	1360	531	883	711	13363	6134	45.91	.60
195	2408	2701	1961	1647	565	1006	756	7880	5179	65.73	.56
197	2426	31329	7845	653	92	165	81	40083	8755	21.84	.56
199	2444	31283	2647	683	243	293	253	35149	3865	11.00	.83
201	2462	30966	1589	458	225	276	300	33514	2548	7.60	.82
203	2480	5916	1752	565	145	185	118	8563	2647	30.92	.78
205	2498	14446	3118	481	140	182	74	18368	3921	21.35	.77
207	2516	11492	2718	731	237	313	233	15490	3998	25.81	.76
209	2534	29472	2897	378	118	64	54	32929	3457	10.50	1.83
211	2552	29803	1899	353	98	45	31	32198	2395	7.44	2.17
213	2570	20179	1540	319	106	55	60	22200	2021	9.10	1.92
215	2588	15752	2536	397	134	68	74	18888	3135	16.60	1.97
217	2606	7938	3950	409	110	57	68	12464	4525	36.31	1.92
219	2624	4392	3029	474	114	110	171	8119	3727	45.90	1.03
221	2642	31772	5033	886	298	85	112	38073	6302	16.55	3.51
223	2660	5381	2130	568	186	209	123	8474	3093	36.50	.89
225	2678	9997	3357	1291	448	413	373	15506	5509	35.53	1.08
227	2696	6534	3102	1083	394	385	322	11498	4964	43.17	1.02
229	2714	3439	2335	902	340	342	344	7358	3919	53.27	.99
231	2732	875	1013	549	194	211	219	2842	1967	69.21	.92
233	2750	17985	5649	1443	444	380	267	25901	7916	30.56	1.17
235	2768	4204	2400	979	336	345	291	8264	4061	49.13	.97
237	2786	3125	1749	816	303	350	303	6342	3218	50.73	.86
239	2804	1229	1058	661	248	304	316	3500	2271	64.88	.82
241	2828	1053	900	587	249	340	348	3129	2076	66.35	.73

TABLE I b.

CONCENTRATION (ul Gas / kg Rock) OF C1 - C7 HYDROCARBONS IN CUTTINGS.

U .	DEPTH (m)	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4 / nC4
243	2846	519	352	306	127	2067	275	3371	2852	84.59	.06
245	2864	1426	715	457	174	218	184	2991	1565	52.32	.80
247	2882	231	183	228	131	230	269	1002	772	76.97	.57

TABLE I c.

CONCENTRATION (ul Gas / kg Rock) OF C1 - C7 HYDROCARBONS (Ia + Ib).

KU o.	DEPTH (m)	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4 --- nC4
5073	1020	11225	517	517	509	9	1090	12777	1552	12.15	5.88
5074	1040	31670	16	32	11	8	59	31736	66	.21	1.34
5075	1060	14539	8	5	4	4	30	14560	21	.14	.99
5076	1080	20853	5	31	5	7	70	20901	48	.23	.75
5077	1100	12039	5	9	2	2	33	12057	18	.15	1.19
5078	1120	10180	5	3			6	10188	8	.08	-
5079	1140	12976	7	23	5		62	13012	36	.27	-
5080	1160	17043	9	4	6	8	44	17070	27	.16	.66
5081	1180	10873	4	5		3	20	10885	12	.11	.00
5082	1200	15407	6	8		5	34	15426	19	.12	.00
5083	1220	9164	72	208	89	174	375	9707	543	5.59	.51
5084	1240	5364	2	2		1	4	5370	5	.10	.00
5085	1260	16214	125	283	143	327	1570	17093	879	5.14	.44
5086	1280	12064	7	7			8	12078	14	.12	-
5087	1300	13745	34	33	21	89	35	13922	177	1.27	.23
5088	1320	14532	9	10	2	2	8	14554	22	.15	1.09
5089	1340	12876	17	14	4	51	279	12962	86	.66	.09
5090	1360	18810	33	27	9	67	19	18947	137	.72	.14
5091	1380	14815	18	24	10	5	49	14871	56	.38	1.88
5092	1400	46299	31	76	19	10	65	46434	135	.29	1.89
5093	1420	98357	91	163	54	18	77	98684	326	.33	3.07
5094	1440	75190	143	198	102	20	168	75652	462	.61	5.16
5095	1460	5311	9	9	5	1	7	5335	24	.45	6.57
5096	1480	43311	75	75	49	8	38	43517	206	.47	6.06
5097	1500	35448	36	49	22	5	33	35561	113	.32	4.42

TABLE I c.

CONCENTRATION (ul Gas / kg Rock) OF C1 - C7 HYDROCARBONS (Ia + Ib).

U .	DEPTH (m)	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4 / nC4
098	1510	47027	43	69	42	7	38	47188	161	.34	6.19
099	1520	43449	73	111	71	5	30	43709	260	.60	4.36
101	1540	53464	69	100	55	7	39	53694	230	.43	7.47
103	1560	45440	110	128	48	20	107	45745	305	.67	2.44
105	1580	142532	259	366	113	38	262	143307	776	.54	2.96
107	1600	38881	130	211	87	43	149	39352	471	1.20	2.04
109	1620	22150	99	136	50	26	124	22462	312	1.39	1.90
111	1640	111948	263	324	75	18	28	112628	680	.60	4.13
113	1660	114376	275	307	75	14	36	115048	671	.58	5.31
115	1680	26853	71	92	44	7	313	27067	214	.79	5.89
117	1700	12993	82	55	24	5	22	13159	166	1.26	4.94
119	1720	7758	59	45	18	16	104	7897	139	1.76	1.15
121	1740	13829	274	32	7	3	27	14145	316	2.23	2.37
123	1760	10564	289	11	2	1	15	10867	303	2.79	1.92
125	1778	5829	48	18	4	5	2	5904	74	1.26	.76
127	1796	257	30	2				289	32	11.07	
129	1814	8825	272	10	6			9113	288	3.16	
131	1832	13643	947	58	9	4		14660	1017	6.94	2.43
132	1841	549	71	24	15	17	26	676	127	18.76	.91
133	1850	6648	495	59	29	47	453	7278	630	8.66	.62
134	1859	3485	244	238	178	336	2298	4481	996	22.23	.53
135	1886	2859	215	595	643	1210	7773	5522	2664	48.23	.53
137	1886	7503	860	8543	7279	13590	44821	37774	30271	80.14	.54
139	1904	28469	6621	24058	7971	15570	17704	82689	54219	65.57	.51
141	1922	41013	8982	36256	14891	28615	26630	129756	88743	68.39	.52

TABLE I c.

CONCENTRATION (ul Gas / kg Rock) OF C1 - C7 HYDROCARBONS (Ia + Ib).

U.	DEPTH (m)	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4 --- nC4
143	1940	16412	4524	25517	13814	27286	16612	87554	71141	81.25	.51
145	1958	12557	2801	11257	6208	12253	8217	45076	32519	72.14	.51
147	1976	4853	1736	9512	5897	12016	8234	34015	29162	85.73	.49
149	1994	3289	1451	9776	6554	13185	7804	34255	30966	90.40	.50
151	2012	2382	1204	6173	3079	6358	4238	19195	16814	87.59	.48
153	2030	4104	1629	7082	4322	8718	7864	25855	21752	84.13	.50
155	2048	1214	574	5102	6466	14611	13110	27966	26752	95.66	.44
157	2066	7065	848	3484	3161	6536	4935	21095	14030	66.51	.48
159	2084	2790	611	3644	3864	8097	6268	19006	16216	85.32	.48
161	2102	12383	1285	3207	2906	6283	5643	26063	13681	52.49	.46
163	2120	11977	1731	2273	633	1088	1301	17703	5726	32.35	.58
165	2138	745	257	987	336	592	349	2918	2173	74.46	.57
167	2156	530	380	1665	2466	5315	8509	10357	9827	94.88	.46
169	2174	2977	409	518	776	1170	3716	5851	2873	49.11	.66
171	2192	930	596	877	1515	2084	8681	6003	5073	84.51	.73
173	2210	4817	1868	2751	2321	3459	5921	15216	10399	68.34	.67
175	2228	1248	952	3674	2848	5165	7144	13886	12638	91.01	.55
177	2246	21792	19176	4913	3684	1583	1833	51148	29356	57.39	2.33
179	2264	6669	2211	3212	1870	3259	3582	17219	10551	61.27	.57
181	2282	19506	4482	6960	3347	6402	7239	40697	21191	52.07	.52
183	2300	13128	1343	3336	2316	4670	5806	24793	11665	47.05	.50
185	2318	8043	4189	2452	826	1144	792	16654	8611	51.71	.72
187	2336	30915	8134	2133	777	988	751	42948	12033	28.02	.79
189	2354	30320	5694	2156	805	1132	820	40107	9786	24.40	.71
191	2372	44317	11048	1880	464	305	267	58014	13697	23.61	1.52

TABLE I c.

CONCENTRATION (ul Gas / kg Rock) OF C1 - C7 HYDROCARBONS (Ia + Ib).

U .	DEPTH (m)	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4 / nC4
193	2390	7772	3376	1368	533	886	714	13935	6163	44.23	.60
195	2408	3682	2001	1661	571	1012	761	8927	5245	58.76	.56
197	2426	48987	8134	708	106	185	101	58120	9133	15.71	.58
199	2444	32732	2662	684	244	293	254	36616	3883	10.61	.83
201	2462	52002	1634	469	234	281	311	54620	2617	4.79	.83
203	2480	147798	2597	725	194	254	274	151568	3770	2.49	.77
205	2498	39822	3851	564	154	200	99	44592	4769	10.70	.77
207	2516	25473	3088	792	251	333	262	29937	4463	14.91	.76
209	2534	42371	3178	396	122	68	59	46137	3765	8.16	1.79
211	2552	35218	1984	364	100	46	32	37714	2495	6.62	2.17
213	2570	25182	1623	326	108	56	60	27295	2114	7.74	1.93
215	2588	28291	2814	436	141	74	80	31755	3464	10.91	1.90
217	2606	11627	4143	412	112	59	69	16353	4726	28.90	1.89
219	2624	11200	3267	504	119	116	178	15205	4006	26.34	1.02
221	2642	34907	5108	906	303	91	118	41315	6408	15.51	3.33
223	2660	18412	2407	624	198	215	129	21856	3444	15.76	.92
225	2678	21706	3730	1394	482	449	425	27761	6055	21.81	1.07
227	2696	13885	3518	1137	403	403	334	19345	5460	28.22	1.00
229	2714	4176	2387	912	344	348	354	8168	3991	48.87	.99
231	2732	7652	1315	605	211	229	249	10013	2361	23.58	.92
233	2750	24773	5957	1497	455	389	273	33071	8298	25.09	1.17
235	2768	12312	2742	1031	348	356	299	16788	4476	26.66	.98
237	2786	8081	1923	849	311	358	310	11522	3441	29.86	.87
239	2804	18239	1746	811	284	344	353	21424	3185	14.87	.83
241	2828	3826	1023	629	263	359	367	6100	2274	37.28	.73

TABLE I c.

CONCENTRATION (ul Gas / kg Rock) OF C1 - C7 HYDROCARBONS (Ia + Ib).

KU No.	DEPTH (m)	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4 / nC4
5243	2846	3914	591	380	146	2094	312	7125	3211	45.06	.07
5245	2864	2877	833	493	186	231	209	4620	1743	37.72	.80
5247	2882	767	218	244	136	236	269	1601	834	52.10	.58

Lithology and Total Organic Carbon measurements

TABLE NO.: II
WELL NO.: 6507/11-2

Sample	Depth (m)	TOC		Lithology
-5073	1000-1020		80%	Sand, fine to very coarse, angular to subangular grains
			20%	Rock fragments, larger than 2mm, mainly derived from metamorphic and plutonic rocks.
			Sm.am.	Shell fragments
				Coal
				Pyrite
				Mica
-5074	1020-1040		80%	Sand, as above
			20%	Rock fragments, as above
			Sm.am.	Coal
				Shell fragments
				Pyrite (trace)
				Mica
-5075	1040-1060		80%	Sand, as above
			20%	Rock fragments
			Sm.am.	Shell fragments
				Microfossils of various kinds
				Coal, dark grey to black
				Mica (both muscovite and biotite)
-5076	1060-1080		85%	Sand, fine to very coarse, angular to subrounded, as above
			15%	Rock fragments, larger than 2mm, derived from plutonic and metamorphic rocks.
			Sm.am.	Coal
				Mica
				Shell fragments
				Microfossils of various types.

Lithology and Total Organic Carbon measurements

TABLE NO.: II
WELL NO.: 6507/11-2

ample	Depth (m)	TOC	Lithology	
·5077	1080-1100		90%	Sand, subangular to subrounded, as above
			10%	Rock fragments, as above
			Sm.am.	Shell fragments
				Coalified/Calcified wood
				Coal
				Black? glauconite
·5078	1100-1120		80%	Sand, as above
			20%	Rock fragments, as above
			Sm.am.	Shell fragments
				Mica
				Coal
·5079	1120-1140		90%	Sand, as above
			10%	Rock fragments, derived from metamorphic and plutonic rocks
			Sm.am.	Mica (muscovite and biotite)
				Shell fragments
				Coal (black)
·5080	1140-1160		80%	Sand, medium to very coarse, angular to subrounded, unconsolidated
			20%	Rock fragments, mainly derived from metamorphic/plutonic rocks
			Sm.am.	Shell fragments
				Coal fragments
				Foraminifera
				Mica
				Pyritized wood fragments

Lithology and Total Organic Carbon measurements

TABLE NO.: II
WELL NO.: 6507/11-2

Sample	Depth (m)	TOC		Lithology
-5082	1180-1200		90%	Sand, as above
			10%	Rock fragments, as above
			Sm.am.	Shell fragments
				Coal fragments
				Foraminifera
				Mica
				Hornblende
				Pyrite
-5083	1200-1220		90%	Sand, as above, fine to very coarse, angular to subrounded
			10%	Rock fragments
			Sm.am.	Shell fragments
				Siltstone, sandy, light grey
				Coal fragments
-5084	1220-1240		85%	Sand, mainly quartz, fine to very coarse, angular to subrounded
			15%	Rock fragments, plutonic/meta-morphic rock types
			Sm.am.	Shell fragments
				Coal fragments
				Mica (both biotite and muscovite)
				Pyrite
-5085	1240-1260		90%	Sand, as above
			10%	Rock fragments, as above
			Sm.am.	Shell fragments (including a gastropod fragment)
				Mica
				Foraminifera

Lithology and Total Organic Carbon measurements

TABLE NO.: II
WELL NO.: 6507/11-2

Sample	Depth (m)	TOC	Lithology	
-5086	1260-1280		90%	Sand, as above
			10%	Rock fragments, as above
			Sm.am.	Shell fragments
				Mica
				Consolidated grey sandy silt-stone
				Pyrite
-5087	1280-1300		80%	Sand, as above
			20%	Rock fragments, as above
			Sm.am.	Shell fragments
				Mica
-5088	1300-1320		80%	Sand, as above
			20%	Rock fragments, as above
			Sm.am.	Mica
				Shell fragments
				Foraminifera
				Fragments of consolidated fine grained sandstone
				Dark green glauconite
-5089	1320-1340		70%	Sand, as above
			30%	Rock fragments, as above
			Sm.am.	Shell fragments
				Pyritized wood fragments
				Coal
				Mica

Lithology and Total Organic Carbon measurements

TABLE NO.: II
WELL NO.: 6507/11-2

ample	Depth (m)	TOC		Lithology
-5090	1340-1360		70%	Sand, mainly quartz, medium to very coarse
			30%	Rock fragments, as above
			Sm.am.	Shell fragments
				Pyrite, as crystal aggregates
				?Coal
				Mica
				Foraminifera
-5091	1360-1380		50%	Sand, as above
			50%	Rock fragments, as above
			Sm.am.	Shell fragments
				Foraminifera
				Pyrite and pyritised wood fragments
				Mica
-5092	1380-1400		70%	Sand, as above
			30%	Rock fragments, as above
			Sm.am.	as above
-5093	1400-1420		50%	Sand, as above
			50%	Rock fragments
			Sm.am.	Light grey, silty micaceous claystone
				Shell fragments
				Pyrite, often as aggregates of spheres
				Coal fragments

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Lithology and Total Organic Carbon measurements

TABLE NO.: II
WELL NO.: 6507/11-2

Sample	Depth (m)	TOC		Lithology
-5094	1420-1440		40%	Sand, as above
			50%	Rock fragments, as above
		1.07	10%	Claystone, silty, light grey, light brownish grey, micaceous, soft
			Sm.am.	Shell fragments
				Pyrite
				Coal
				Mica
-5095	1440-1460		40%	Sand, as above
			30%	Glauconite, dark green as single grains
		0.43	20%	Claystone, as above
			10%	Rock fragments, as above
			Sm.am.	Pyrite
				Shell fragments
				Oolite
-5096	1460-1480		60%	Sand, as above
		0.18	10%	Claystone, as above
			20%	Rock fragments, as above
			10%	Glauconite, as above
			Sm.am.	Pyrite
				Foraminifera
				Shell fragments
				Brown limestone

Lithology and Total Organic Carbon measurements

TABLE NO.: II
WELL NO.: 6507/11-2

ample	Depth (m)	TOC	Lithology	
-5097	1480-1500		60%	Casing cement
			15%	Sand, as above
			5%	Rock fragments
		0.75	20%	Claystone, light grey, light brownish grey, occ. silty, sandy, micaceous
			Sm.am.	Shell fragments
				Glauconite
				Coal
-5098	1500-1510	1.66	50%	Silty claystone/siltstone, mainly brownish, grey, micaceous, containing glauconite
			45%	Sand, (unconsolidated) medium to very coarse
			5%	Rock fragments, as above
			Sm.am.	Coal
				Pyrite
				Shell fragments
				Glauconite
-5099	1510-1520		40%	Sand, medium to very coarse, mainly quartz
		1.16	50%	Siltstone, light brownish grey, sandy, glauconitic, ?oolitic
			10%	Rock fragments, as above
			Sm.am.	Glauconite
				Shell fragments
				Pyrite

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Lithology and Total Organic Carbon measurements

TABLE NO.: II
WELL NO.: 6507/11-2

Sample	Depth (m)	TOC		Lithology
-5101	1530-1540		25%	Sand, as above
		1.97	70%	Siltstone, as above
			5%	Rock fragments, as above
			Sm.am.	Glauconite
				Pyrite
				Shell fragments
-5103	1550-1560	1.84	70%	Siltstone, light brownish, grey
		1.01	10%	Claystone, light brownish, grey, silty, micaceous, containing some glauconite, very similar to siltstone above
			15%	Sand, as above
			5%	Rock fragments
			Sm.am.	Glauconite
				Shell fragments
				Pyrite
-5105	1570-1580	1.74	70%	Siltstone, as above
		0.95	20%	Claystone, as above
			10%	Sand, as above
			Sm.am.	Pyrite
				Glauconite (rare)
				Shell fragments
				Rock fragments

Lithology and Total Organic Carbon measurements

TABLE NO.: II
WELL NO.: 6507/11-2

ample	Depth (m)	TOC		Lithology
-5107	1590-1600	3.09	90%	Siltstone, light brownish, grey, as above
		1.35	10%	Claystone, silty, micaceous, calcareous
			Sm.am.	Rock fragments, as above
				Sand, as above
				Chalk, white
				Pyrite
				Glauconite
-5109	1610-1620	2.35	95%	Siltstone, as above
			5%	Claystone, silty, as above
			Sm.am.	Glauconite (trace)
				Rock fragments
				Sand, as above
				Pyrite (trace)
-5111	1630-1640	1.82	95%	Siltstone, as above
			5%	Claystone, silty, as above
			Sm.am.	Rock fragments
				Sand, as above
				Glauconite (trace)
				Pyrite (trace)
113	1650-1660	1.61	80%	Siltstone, light brownish, grey (lighter than above), micaceous, non calcareous
			20%	Claystone, somewhat finer grained but otherwise as above
			Sm.am.	Glauconite
				Rock fragments
				Sand, as above

Lithology and Total Organic Carbon measurements

TABLE NO.: II
WELL NO.: 6507/11-2

Sample	Depth (m)	TOC		Lithology
-5115	1670-1680	1.46	100%	Siltstone/silty claystone, light brownish grey, micaceous, with coalified plant fragments
			Sm.am.	Rock fragments
				Pyrite
				Glauconite
				Sand, as above (trace)
				Rock fragments
-5117	1690-1700	1.12	100%	Siltstone, silty claystone, light brownish grey, brownish grey, grey, noncalcareous, occ. waxy
			Sm.am.	Glauconite
				Pyrite
				Rock fragments
-5119	1710-1720	1.57	40%	Siltstone, as above
		0.72	60%	Claystone, grey, brownish grey, greenish grey, light brownish grey, noncalcareous
			Sm.am.	Pyrite
-5121	1730-1740	0.53	20%	Siltstone, as above
		1.93	80%	Claystone, light brownish grey, brownish grey, greenish grey, light greenish grey, slightly calcareous, occ. waxy
			Sm.am.	Pyrite
				Foraminifera and other micro-fossils

Lithology and Total Organic Carbon measurements

TABLE NO.: II
WELL NO.: 6507/11-2

ample	Depth (m)	TOC		Lithology
5123	1750-1760	0.24	80%	Claystone, as above, occ. purplish grey
			5%	Claystone, reddish brown
			15%	Siltstone, as above
			Sm.am.	Pyrite
				Rock fragments
				Limestone, grey, brownish grey
5125	1769-1778	0.25	85%	Claystone, grey, greenish grey, brownish grey, etc., somewhat waxy
		0.48	10%	Claystone, reddish brown Siltstone
			5%	Limestone, brownish white chalky, with chert.
			Sm.am.	Limestone, grey, brownish grey
5127	1787-1796	0.42	85%	Claystone, grey, greenish grey etc., as above, but slightly more waxy
			5%	Claystone, reddish brown
		1.07	10%	Siltstone, as above
			Sm.am.	Coalified wood fragments
				Pyrite (trace)

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Lithology and Total Organic Carbon measurements

TABLE NO.: II
WELL NO.: 6507/11-2

Sample	Depth (m)	TOC		Lithology
-5129	1805-1814	0.27	50%	Claystone, silty, grey, calcareous, rich in ? fossil fragments
		0.61	40%	Claystone, grey, greenish grey, brownish grey, as above
			5%	Claystone, light reddish brown, as above
			5%	Siltstone, as above
			Sm.am.	Pyrite
				Bluish-green claystone
				Chalk
				Coal
-5131	1823-1832	0.91	95%	Claystone, silty, grey, as above
			5%	Claystone, brownish grey, greenish grey, as above
			Sm.am.	Claystone, reddish brown
				Claystone, bluish green
				?Tuff, with fine lamination
				Pyrite
				Coal
-5132	1832-1841	1.33	50%	Claystone, silty, grey, as above
		0.78	45%	Claystone, greenish grey, brownish grey
			5%	Tuff
			Sm.am.	Coal
				Reddish brown claystone
				(HC staining observed)

Lithology and Total Organic Carbon measurements

TABLE NO.: II
WELL NO.: 6507/11-2

Sample	Depth (m)	TOC		Lithology
-5133	1841-1850	1.41	50%	Claystone, silty, grey, as above
		0.52	45%	Claystone, brownish grey, greenish grey
			5%	Coal, coalified wood fragments
			Sm.am.	Pyrite
				Reddish brown claystone
				Tuff
				(HC staining on cuttings)
-5134	1850-1859		5%	Claystone, silty, grey, as above
		0.45	95%	Claystone, greenish grey, grey, brownish grey, light purplish grey
			Sm.am.	Limestone, brownish white
				Coal
				(Occasional HC staining)
-5135	1859-1868	0.60	95%	Claystone, grey, greenish grey, brownish grey
			5%	Claystone, silty, grey, as above
			Sm.am.	Claystone, reddish brown, light purplish grey
				Coal
				(Occasional HC staining)
-5136	1868-1877	0.67	70%	Claystone, greenish grey, grey, calcareous
			15%	Claystone, red-brown
			10%	Rock fragments (metamorphosed sandstone?)
			5%	Coal
			Sm.am.	Glauconite
				(HC staining)

Lithology and Total Organic Carbon measurements

TABLE NO.: II
WELL NO.: 6507/11-2

Sample	Depth (m)	TOC		Lithology
-5137	1877-1886	0.65	95%	Claystone, light grey, light greenish grey, light brownish grey
			5%	Claystone, silty, grey
			Sm.am.	Claystone, reddish brown, light purplish grey
				Coal
				Tuff
				Pyrite
-5138	1886-1895	1.10	85%	Claystone, greenish grey, grey, shaley
			10%	Claystone, red, brown
			5%	Rock fragments (metamorphosed sandstone?)
				(HC staining)
-5139	1895-1904	0.88	95%	Claystone, mainly light grey, but also light brownish grey and light greenish grey. Olive green and yellow also observed
			5%	Claystone, grey, dark grey, often silty, microfissile
			Sm.am.	Chalk, white
				Claystone, reddish brown
				Coal

Lithology and Total Organic Carbon measurements

TABLE NO.: II
WELL NO.: 6507/11-2

Sample	Depth (m)	TOC		Lithology
-5140	1904-1913	0.81	60%	Claystone, light grey, green
		10.10	35%	Shale, dark grey to black, some coaly fragments
			3%	Claystone, red, brown
			2%	Rock fragments (metamorphic?)
			Sm.am.	Cement, white
				Pyrite
				Glauconite
-5141	1913-1922	1.73	90%	Claystone, grey, greenish grey, brownish grey, as above
		11.87	10%	Claystone/Shale, dark grey, grey, fissile, often silty, carbona-ceous
			Sm.am.	Reddish brown claystone
				Pyrite
				Chalk, white
				Coal
-5142	1922-1931	1.14	60%	Claystone, greenish grey
		9.22	30%	Shale, dark grey to black
			7%	Claystone, red, brown
			3%	Coal
			Sm.am.	Cement
				Pyrite

Lithology and Total Organic Carbon measurements

TABLE NO.: II
WELL NO.: 6507/11-2

Sample	Depth (m)	TOC		Lithology
-5143	1931-1940	0.56	90%	Claystone, grey, greenish grey, brownish grey, as above
		8.33	10%	Claystone, silty, grey, dark grey, occ. subfissile
			Sm.am.	Pyrite
				Claystone, reddish brown
				Sandstone, very fine grained, grey
				Chalk, white, often with pyrite
-5144	1940-1949	1.14	60%	Claystone, greenish grey
		5.72	20%	Shale, black, some coaly fragments
			20%	Sand, loose grains
			Sm.am.	Claystone, red
				Pyrite
-5145	1949-1958		95%	Sand, loose, medium to coarse, subangular to subrounded, mainly quartz grains, well sorted
			3%	Claystone, grey, greenish grey, brownish grey, as above
			1%	Claystone, dark grey, as above
			1%	Pyrite
			Sm.am.	Mica
				Coal
				Claystone, reddish brown

Lithology and Total Organic Carbon measurements

TABLE NO.: II
WELL NO.: 6507/11-2

Sample	Depth (m)	TOC		Lithology
-5146	1958-1967	0.73	75%	Claystone, green, greenish grey, reddish brown, grey
			20%	Sandstone
			5%	Coal
			Sm.am.	Rock fragments
				Pyrite
				Rust
				Paint
-5147	1967-1976	0.86	55%	Claystone, grey to dark grey, partly fissile often silty
		0.33	30%	Claystone, light grey, light greenish or brownish grey
			10%	Casing cement, buff to brownish white, loose
			5%	Sand, as above
			Sm.am.	Pyrite
				Coal
				Reddish brown claystone
				Chalk, white
-5148	1976-1985	0.66	80%	Claystone, light green to light grey, greyish brown, silty
			20%	Shale, dark grey to black
			Sm.am.	Quartz grains
				Coal
				Pyrite
				Rock fragments

Lithology and Total Organic Carbon measurements

TABLE NO.: II
WELL NO.: 6507/11-2

Sample	Depth (m)	TOC		Lithology
-5149	1985-1994	0.45	65%	Claystone, grey, greenish grey, brownish grey, as above
		2.46	20%	Claystone, dark grey, as above
			15%	Sand, medium to very coarse, very coarse grains well rounded, whereas smaller grains are subangular to subrounded
			Sm.am.	Coal
				Pyrite
				Casing cement
				Mica
-5150	1994-2003	0.97	60%	Claystone, green, light grey, silty
			15%	Shale, dark grey to black
			15%	Quartz grains
			10%	Mica
			Sm.am.	Coal
				Rust
-5151	2003-2012		40%	Sand, medium to very coarse, subangular to subrounded
		4.94	40%	Claystone, dark grey, subfissile, often silty
		0.33	20%	Claystone light grey, light greenish and brownish grey
			Sm.am.	Mica (abundant)
				Coal and pyrite present only in traces

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Lithology and Total Organic Carbon measurements

TABLE NO.: II
WELL NO.: 6507/11-2

Sample	Depth (m)	TOC		Lithology
-5153	2021-2030		20%	Sand, as above
		0.34	60%	Claystone, light grey, light greenish and brownish grey, as above
		2.16	20%	Claystone, dark grey, often silty, as above
			Sm.am.	Coal
				Mica
				Pyrite
-5155	2039-2048		95%	Sand, medium to coarse, angular to subangular, well-sorted, mainly quartz grains, often HC stained grains
			5%	Coal
			Sm.am.	Various claystones
				Mica
-5156	2048-2057		75%	Sandstone and loose quartz grains, brown stains
		1.02	15%	Siltstone/claystone, green to grey
			10%	Coal
			Sm.am.	Claystone, red
				Mica
				Pyrite
				(Heavy HC staining)

Lithology and Total Organic Carbon measurements

TABLE NO.: II
WELL NO.: 6507/11-2

Sample	Depth (m)	TOC	Lithology	
-5157	2057-2066		90%	Sand, medium to coarse, occ. very coarse, subangular to subrounded, loose, poorly cemented, HC stained
			8%	Claystones of various types, mentioned above
			1%	Pyrite
			1%	Coal
			Sm.am.	Mica
-5158	2066-2075		70%	Sandstone and loose quartz grains, brown stains
		0.78	20%	Claystone/siltstone, green to grey
			10%	Shale, grey, coaly
			Sm.am.	Pyrite
				Mica
				(Heavy HC staining)
-5159	2075-2084		80%	Sand, medium to coarse, HC stained, as above
			5%	Coal
		0.58	10%	Claystone, mainly grey, brownish grey, greeenish grey
			5%	Additives (lignosulfonate and mica) and casing cement
			Sm.am.	Pyrite
-5160	2084-2093		80%	Quartz grains, loose, brown and black stains
		0.75	15%	Claystone, green to brown, silty
			5%	Coal
			Sm.am.	Mica
				(Heavy HC staining)

Lithology and Total Organic Carbon measurements

TABLE NO.: II
WELL NO.: 6507/11-2

Sample	Depth (m)	TOC		Lithology
-5161	2093-2102		95%	Sand, loose, as above
			5%	Claystone, as above
			Sm.am.	Pyrite
				Coal
				Mica
				Additives (mainly lignosulfonate)
-5162	2102-2111		70%	Quartz grains, loose, brown stains
		0.88	30%	Claystone, dark grey, grey, green, brown
			Sm.am.	Coal
				Pyrite
				(Heavy HC staining)
-5163	2111-2120		90%	Sand, fine to coarse, loose, subangular to subrounded
			8%	Claystone, as above
			2%	Pyrite as crystal aggregates
			Sm.am.	Coal
				Mica
-5164	2120-2129		70%	Quartz grains, loose, brown stains
		1.02	30%	Claystone, greenish grey, brown, shaley
			Sm.am.	Pyrite
				Glauconite
				(Light brown HC staining)

Lithology and Total Organic Carbon measurements

TABLE NO.: II
WELL NO.: 6507/11-2

Sample	Depth (m)	TOC		Lithology
-5165	2129-2138		95%	Sand, medium to coarse, subangular to subrounded, mainly quartz grains, loose
			5%	Claystone, grey, brownish and greenish grey, often silty
			Sm.am.	Coal
				Pyrite
				Mica
-5166	2138-2147		90%	Quartz grains, loose, brown stains
			7%	Claystone, greenish grey
			3%	Coal
			Sm.am.	Pyrite
				(HC staining)
-5167	2147-2156		95%	Sand, coarse to medium, as above
			5%	Claystone, as above
			Sm.am.	Coal
				Mica
				Pyrite
-5169	2165-2174		95%	Sand, coarse to medium, as above
			5%	Claystone, as above
			Sm.am.	Coal
				Pyrite
				Mica
				Coalified and pyritized wood fragments

Lithology and Total Organic Carbon measurements

TABLE NO.: II
WELL NO.: 6507/11-2

Sample	Depth (m)	TOC		Lithology
-5171	2183-2192		98%	Sand, loose, medium to coarse, as above
			2%	Claystone, as above
			Sm.am.	Pyrite
				Mica
-5173	2201-2210		98%	Sand, medium to coarse, subangular to subrounded, well sorted, poorly cemented
			2%	Limestone, light brown, probably sideritic
			Sm.am.	Claystone, as above
				Pyrite
				Coal
				Mica
-5175	2219-2228		95%	Sand, medium to very coarse, as above
			5%	Claystone, silty, as above
			Sm.am.	Pyrite and pyritized wood fragments
				Limestone, light brown occasionally oolitic
				Coal
-5177	2237-2246		95%	Sand, medium to coarse, poorly cemented, angular to subangular grains, mainly quartz
			5%	Coal, dark grey to black
			Sm.am.	Pyrite
				Mica
				Claystone, as above

Lithology and Total Organic Carbon measurements

TABLE NO.: II
WELL NO.: 6507/11-2

ample	Depth (m)	TOC		Lithology
-5179	2255-2264		80%	Sand, very fine to fine, well cemented, calcite and pyrite cement, micaceous and with some plant material
		0.57	15%	Siltstone, light grey to white, grey
			5%	Claystone, grey, brownish grey, greenish grey
			Sm.am.	Coal
				Pyrite
				Sand, medium to coarse, loose, as above
-5181	2273-2282		80%	Sand, grey to white, as above, but with more matrix
		1.35	15%	Siltstone, as above
			4%	Claystone, as above
			1%	Pyrite
			Sm.am.	Reddish brown claystone
				Coal
				Pyrite
				Sand, as above
				Limestone, brown to white

Lithology and Total Organic Carbon measurements

TABLE NO.: II
WELL NO.: 6507/11-2

ample	Depth (m)	TOC		Lithology
·5183	2291-2300		40%	Sandstone, very fine to fine, well cemented, as above
			20%	Sand, loose, fine to medium
		1.46	20%	Siltstone, light grey, light brownish grey
			5%	Claystone, light grey, light greenish and brownish grey
			15%	Coal, dark grey to black, dull lustre
			Sm.am.	Pyrite
				Mica
5185	2309-2318		95%	Sand, loose, white, medium to coarse
			3%	Coal, dark grey to black
			2%	Claystone, light grey, brownish and greenish grey
			Sm.am.	Sandstone, very fine to fine, well cemented, as above
				Pyrite
5187	2327-2336		80%	Sand, as above
			15%	Coal, as above
			5%	Claystone, as above
			Sm.am.	Dark grey claystone
				Mica

Lithology and Total Organic Carbon measurements

TABLE NO.: II
WELL NO.: 6507/11-2

ample	Depth (m)	TOC		Lithology
-5189	2345-2354		98%	Sand, coarse to very coarse, subangular to subrounded, white, mainly quartz, loose
			2%	Coal, as above
			Sm.am.	Pyrite
				Claystone greenish grey, brownish grey
				Claystone, dark grey
-5191	2363-2372		95%	Sand, medium to coarse
			5%	Coal, as above
			Sm.am.	Pyrite
				Claystone, grey, greenish and brownish grey
				Sandstone, well cemented, very fine to medium
-5193	2381-2390		98%	Sand, fine to medium, occ. coarse, loose, mainly quartz
			2%	Coal
			Sm.am.	Claystone, dark brownish grey
				Sandstone, very fine to fine, well cemented
				Pyrite
-5195	2399-2408		98%	Sand, very fine to medium, loose, or moderately cemented, mainly quartz
			2%	Claystone, mainly dark grey
			Sm.am.	Coal
				Pyrite
				Claystone, grey

Lithology and Total Organic Carbon measurements

TABLE NO.: II
WELL NO.: 6507/11-2

ample	Depth (m)	TOC		Lithology
-5197	2417-2426		50%	Sand, medium to coarse, mainly quartz
			50%	Coal, occasionally containing clay, black, dark grey, dark brownish grey
			Sm.am.	Dark grey, dark brownish grey claystone
				Grey siltstone
				Grey claystone
				Pyrite
-5199	2435-2444		20%	Sand, medium to coarse, as above
			70%	Coal, as above
		11.85	10%	Claystone, dark grey, carbonaceous
			Sm.am.	Grey and brownish grey claystone
				Reddish brown claystone
				Pyrite
-5201	2453-2462		40%	Sand/sandstone, fine to medium, occ. coarse, loose, but occ. well cemented
			5%	Claystone/shale, dark grey, occ. silty
			50%	Coal, as above
			5%	Claystone, light grey, light greenish or brownish grey
			Sm.am.	Pyrite

Lithology and Total Organic Carbon measurements

TABLE NO.: II
WELL NO.: 6507/11-2

ample	Depth (m)	TOC		Lithology
-5203	2471-2480		70%	Sand, loose, medium to coarse, as above
		9.65	10%	Claystone, dark grey, dark brownish grey
			15%	Coal, as above
			5%	Claystone, light grey etc.
			Sm.am.	Mica
				Pyrite
				Reddish brown claystone
-5205	2489-2498		40%	Sand, loose, medium to coarse
			10%	Sandstone, very fine to fine, well cemented
		17.22	40%	Claystone, dark grey, carbonaceous
			10%	Coal, as above
			Sm.am.	Pyrite
				Mica
-5207	2507-2516		80%	Sand, loose, medium to coarse, subangular to subrounded, mainly quartz grains
		9.41	10%	Claystone, dark grey, dark brownish grey, carbonaceous
			3%	Claystone, grey etc., as above
			7%	Coal, as above
			Sm.am.	Pyrite
				Mica

Lithology and Total Organic Carbon measurements

TABLE NO.: II
WELL NO.: 6507/11-2

ample	Depth (m)	TOC	Lithology	
-5209	2525-2534		70%	Sand, fine to coarse, angular to subangular, moderately cemented
		17.27	10%	Claystone, dark grey, dark brownish grey, carbonaceous
			20%	Coal, as above
			Sm.am.	Mica
				Light grey claystone
-5211	2543-2552		30%	Sand, medium to coarse, angular to subangular, poorly cemented
		13.02	30%	Claystone, dark grey, dark brownish grey, carbonaceous
			40%	Coal, as above
			Sm.am.	Light grey, light brownish grey claystone
				Pyrite
-5213	2561-2570		80%	Sand, fine to medium, brownish white, moderately cemented
		13.59	15%	Claystone, very carbonaceous, dark grey, dark brownish grey
			5%	Coal, as above
			Sm.am.	Mica
				Chalk
				Light grey, light brownish grey claystone

Lithology and Total Organic Carbon measurements

TABLE NO.: II
WELL NO.: 6507/11-2

Sample	Depth (m)	TOC	Lithology	
-5215	2579-2588		80%	Sand, fine to medium occ. coarse
		10.22	10%	Claystone, dark grey, dark brownish grey, as above
			8%	Coal, as above
			2%	Claystone, grey, brownish grey
			Sm.am.	Mica
-5217	2597-2606		90%	Sand, loose, fine to medium, angular to subangular, poorly cemented
			5%	Claystone, dark grey etc., as above
			3%	Coal, as above
			2%	Claystone, light grey, light brownish grey
			Sm.am.	Mica
-5219	2615-2624		95%	Sand, fine to coarse, white, loose
			3%	Claystone, dark grey, carbonaceous
			2%	Coal, as above
			Sm.am.	Claystone, grey to brownish grey Pyrite Mica
-5221	2633-2642		95%	Sand, as above
			3%	Claystone, dark grey, as above
			2%	Claystone, light grey, light brownish grey, grey
			Sm.am.	Coal, as above Mica, mainly muscovite Pyrite

Lithology and Total Organic Carbon measurements

TABLE NO.: II
WELL NO.: 6507/11-2

ample	Depth (m)	TOC		Lithology
-5223	2651-2660	44.19	90%	Claystone, dark grey, dark brownish grey, carbonaceous
			5%	Sandstone, well cemented, very fine to fine, calcite cement
			Sm.am.	Pyrite
				Mica
				Sand, medium to coarse
-5225	2669-2678	18.58	60%	Claystone, as above
			30%	Sand, loose, fine to coarse
			10%	Coal
			Sm.am.	Sandstone, well cemented, very fine to fine, as above
				Mica
				Pyrite
-5227	2687-2696	19.76	45%	Claystone, dark grey, as above
			50%	Sand/sandstone, fine to coarse, moderately cemented
			5%	Coal
			Sm.am.	Claystone, light grey, grey, greenish grey, brownish grey
				Mica
				Pyrite
-5229	2705-2714		75%	Sand, fine to medium, loose, occ. stained brown by HC
		10.35	10%	Claystone, dark grey, as above
			5%	Claystone, brownish grey, noncalcareous
			10%	Coal, as above
			Sm.am.	Mica
				Pyrite (rare)

Lithology and Total Organic Carbon measurements

TABLE NO.: II
WELL NO.: 6507/11-2

ample	Depth (m)	TOC		Lithology
-5231	2723-2732		90%	Sand, loose, fine to medium, angular to subangular
			5%	Claystone, light brownish grey, moderately waxy
			3%	Coal, as above
			2%	Claystone, dark grey, carbona-ceous
			Sm.am.	Mica
-5233	2741-2750	0.86	55%	Claystone, light brownish grey, brownish grey, occ. waxy
		14.32	30%	Claystone, dark grey, as above
			10%	Coal, as above
			5%	Sandstone, well cemented, fine to medium
-5235	2757-2768		40%	Sand, weakly cemented, fine to coarse, calcite cement
		1.60	50%	Claystone, light brownish grey, brownish grey
			5%	Claystone, dark grey, as above
			5%	Coal, as above
			Sm.am.	Mica
-5237	2777-2786		40%	Sand, loose, medium to coarse
		2.90	50%	Claystone, brownish grey, as above
			5%	Claystone, dark grey, as above
			5%	Coal, as above
			Sm.am.	Limestone, light brown

Lithology and Total Organic Carbon measurements

TABLE NO.: II
WELL NO.: 6507/11-2

ample	Depth (m)	TOC		Lithology
-5239	2795-2804		40%	Sand, fine to medium, loose, with brown (HC) staining
		2.53	50%	Claystone, brownish grey, as above
			5%	Claystone, dark grey, as above
			5%	Coal, as above
			Sm.am.	Mica
				Oolitic limestone
-5241	2819-2828		95%	Sand, white, fine to medium, loose, occasionally stained brown, grains are mainly quartz
			5%	Claystone, brownish grey, as above
			Sm.am.	Claystone, dark grey
				Coal, as above
				Limestone, light brown
-5243	2837-2846		98%	Sand, as above, occ. coarse
			2%	Claystone, brownish grey, as above
			Sm.am.	Coal
				Dark grey claystone
-5245	2855-2864		55%	Sand, loose, medium to coarse
		1.68	15%	Claystone, brownish grey, as above
		2.75	25%	Claystone, grey to dark grey, silty, subfissile
			5%	Coal, as above
			Sm.am.	Mica

Lithology and Total Organic Carbon measurements

TABLE NO.: II
WELL NO.: 6507/11-2

ample	Depth (m)	TOC	Lithology	
-5247	2873-2882		50%	Sand, partly loose, partly well cemented by calcite, medium to coarse
		2.65	45%	Claystone, grey to dark grey, silty, micaceous
			5%	Claystone, grey to brownish grey, as above
			Sm.am.	Coal, as above
				Mica

TABLE : 3.

CONCENTRATION OF EOM AND CHROMATOGRAPHIC FRACTIONS

U-No	DEPTH (m)	Rock Extr. (g)	EOM (mg)	Sat. (mg)	Aro. (mg)	HC (mg)	Non HC (mg)	TOC (%)
5141	1922.00	1.7	8.2	1.2	0.6	1.8	6.4	9.40
5143	1940.00	10.6	16.1	1.4	1.2	2.6	13.5	8.10
5149	1994.00	10.4	20.0	1.3	1.7	3.0	17.0	8.50
5151	2012.00	12.1	14.0	1.7	2.4	4.1	9.9	5.80
5203	2480.00	5.1	14.0	3.9	2.2	6.1	7.9	25.30
5209	2534.00	16.1	74.0	8.0	14.5	22.5	51.5	38.30
5215	2588.00	44.4	120.1	25.2	23.4	48.6	71.5	28.90
5227	2696.00	45.5	79.2	24.8	19.6	44.4	34.8	20.10
5233	2750.00	5.2	11.4	0.6	0.5	1.1	10.3	36.13
5247	2882.00	2.7	10.6	0.4	0.2	0.6	10.0	7.89

DATE : 6 - 10 - 82.

T A B L E : 4.

WEIGHT OF EOM AND CHROMATOGRAPHIC FRACTIONS

(Weight ppm OF rock)

IKU-No	DEPTH (m)	EOM	Sat.	Aro.	HC	Non HC
M 5141	1922.00	4824	706	353	1059	3765
M 5143	1940.00	1519	132	113	245	1274
M 5149	1994.00	1923	125	163	288	1635
M 5151	2012.00	1157	140	198	339	818
M 5203	2480.00	2745	765	431	1196	1549
M 5209	2534.00	4596	497	901	1398	3199
M 5215	2588.00	2705	568	527	1095	1610
M 5227	2696.00	1741	545	431	976	765
M 5233	2750.00	2192	115	96	212	1981
M 5247	2882.00	3926	148	74	222	3704

DATE : 6 - 10 - 82.

T A B L E : 5.

CONCENTRATION OF EOM AND CHROMATOGRAPHIC FRACTIONS

(mg/g TOC)

IKU-No	DEPTH (m)	EOM	Sat.	Aro.	HC	Non HC
M 5141	1922.00	51.3	7.5	3.8	11.3	40.1
M 5143	1940.00	18.8	1.6	1.4	3.0	15.7
M 5149	1994.00	22.6	1.5	1.9	3.4	19.2
M 5151	2012.00	19.9	2.4	3.4	5.8	14.1
M 5203	2480.00	10.9	3.0	1.7	4.7	6.1
M 5209	2534.00	12.0	1.3	2.4	3.6	8.4
M 5215	2588.00	9.4	2.0	1.8	3.8	5.6
M 5227	2696.00	8.7	2.7	2.1	4.9	3.8
M 5233	2750.00	6.1	0.3	0.3	0.6	5.5
M 5247	2882.00	49.8	1.9	0.9	2.8	46.9

DATE : 6 - 10 - 82.

TABLE : 6.

COMPOSITION IN % OF MATERIAL EXTRACTED FROM THE ROCK

U-No	DEPTH (m)	Sat / EOM	Aro / EOM	HC / EOM	SAT / Aro	Non HC / EOM	HC / Non HC
5141	1922.00	14.6	7.3	22.0	200.0	78.0	28.1
5143	1940.00	8.7	7.5	16.1	116.7	83.9	19.3
5149	1994.00	6.5	8.5	15.0	76.5	85.0	17.6
5151	2012.00	12.1	17.1	29.3	70.8	70.7	41.4
5203	2480.00	27.9	15.7	43.6	177.3	56.4	77.2
5209	2534.00	10.8	19.6	30.4	55.2	69.6	43.7
5215	2588.00	21.0	19.5	40.5	107.7	59.5	68.0
5227	2696.00	31.3	24.7	56.1	126.5	43.9	127.6
5233	2750.00	5.3	4.4	9.6	120.0	90.4	10.7
5247	2882.00	3.8	1.9	5.7	200.0	94.3	6.0

DATE : 6 - 10 - 82.

T A B L E 7

TABULATION OF DATAS FROM THE GASCHROMATOGRAMS

IKU No.	DEPTH (m)	PRISTANE / n-C17	PRISTANE / PHYTANE	CPI
M 5141	1922	2.4	0.6	1.7
M 5143	1940	1.2	0.6	1.8
M 5149	1994	1.1	0.7	1.4
M 5151	2012	1.8	1.1	2.0
M 5203	2480	2.6	4.8	2.1
M 5209	2534	11.0	6.4	2.1
M 5215	2588	N D P	N D P	2.7
M 5227	2692	1.7	6.3	2.5
M 5233	2750	1.9	5.8	4.0
M 5247	2882	0.9	3.2	3.5

DATE : 6 - 10 - 82.

IKU | Visual Kerogen Analysis

WELL NO.: 6507/11-2

Sample	Depth (m)	Composition of residue	Particle size	Preservation palynomorphs	Thermal maturation index	Remarks
M-5136	1877	Cut, W, P/Am, Cy	F-M-L	good	1/1+ 1+	Lightcoloured pollen (Tert.) and cuticles together with reworked older Tertiary material including cysts and woody cell tissue. An amorphous matrix.
M-5140	1913	Cut, W, P, S/Am, Cy	F-M-L	good to fair	1+	Aggregates of cuticular material, fungal spores, degraded woody matter and true amorphous matter. Some pyrite. Very light coloured cysts. Tasmanites. Sapropelised material.
M-5141	1922	Cut, W, P/Am, Cy	F-M-L	good to fair	1+	As above. Abundant Tasmanites. Reworking of Jurassic to Early Jurassic or in place.
M-5143	1940	Cut, W, P/Am, Cy	F-M-L	good to fair	1/1+ 1+	As above. Tertiary pollen (Caving or mud additives).
M-5149	1994	Cut, P, W, /Am, Cy	F-M-L	fair	1+	As above. More of large thick bisaccate pollen, Micrhystrid.

ABBREVATIONS

Am	Amorphous	Cy	Cysts, algae	W	Woody material	F	Fine
He	Herbaceous	P	Pollen grains	C	Coal	M	Medium
Cut	Cuticles	S	Spores	R!	Reworked	L	Large

049/j/ah/1

IKU | # Visual Kerogen Analysis

WELL NO.: 6507/11-2

Sample	Depth (m)	Composition of residue	Particle size	Preservation palynomorphs	Thermal maturation index	Remarks
M-5151	2012	Cut, W, P, S, WR!/Am, Cy	F-M-L	poor to fair	1/1+	Pyritic aggregates of amorphous material enclosing small spherical ?algal/fungal bodies, vitrinite particle,Tasmanitids, pollen, spores and degraded (sapro pelised) cuticles.
M-5203	2480	Cut, W, WR, P/?Am	F-M-L	fair to good	1/1+	Dominantly remains of land plants.
M-5205	2498	W, WR!, Cut, P, S/?Am	F-M-L	good to fair	1/1+	Dominantly remains of land plants. ?Coal. Vitrinite and semifusinite dominate and intergrade towards darker material. Rich in Early Jurassic palynomorphs.
M-5209	2534	W, WR!, Cut, S, P/?Am	F-M-L	good to fair	1/1+	As above, coal fragments mostly of vitrinite. Palynomorphs are in relatively low numbers. Spores dominate.
M-5215	2588	W, WR!, Cut, S, P/	F-M-L	good to fair	1/1+	As above.

ABBREVATIONS

Am	Amorphous	Cy	Cysts, algae	W	Woody material	F	Fine
He	Herbaceous	P	Pollen grains	C	Coal	M	Medium
Cut	Cuticles	S	Spores	R!	Reworked	L	Large

049/j/ah/2

IKU | # Visual Kerogen Analysis

WELL NO.: 6507/11-2

Sample	Depth (m)	Composition of residue	Particle size	Preservation palynomorphs	Thermal maturation index	Remarks
M-5223	2660	W, Cut, WR!, S, P/	F-M	fair to good	1+/2-, 1+/2-	Limbosp. lundbladii and other Latest Triassic palynomorphs together with long ranging spores.
M-5225	2678	W, Cut, WR!, S, P/	F-M	good	1/1+, 1+/2-	As 2660m above but even more Triassic spores.
M-5229	2714	W, WR!, Cut, S, P	F-M-L	good	1+/2-	Abundant Triassic spores and Chasmatosporites. Abundance of structured wood (semifus.) and vitrinite. Coal.
M-5233	2750	W, WR!, Cut, S, P	F-M-L	good	1+/2-	Relative increase in semi-fusinite/fusinite types. Varied spore assemblage.
M-5247	2882	W, Cut, S, P/?Am	F-M-L	good	1+/2-	Triassic spores as above. Bisaccates and Riccisporites group more abundant. Stronger degradation. Botryococcus.

ABBREVATIONS

Am	Amorphous	Cy	Cysts, algae	W	Woody material	F	Fine
He	Herbaceous	P	Pollen grains	C	Coal	M	Medium
Cut	Cuticles	S	Spores	R!	Reworked	L	Large

049/j/ah/3

KU

VITRINITE REFLECTANCE MEASUREMENTS

TABLE NO.: 9

WELL NO. 6507/11-2

ample	Depth	Vitrinite reflectance	Fluorescence in UV light	Exinite content
5094	1420-1440	0.56 (1)	Nil	Nil
5101	1530-1540	0.35 (8)	Nil	Nil
5107	1590-1600	0.34 (19)	Green/yellow and yellow spores	Trace
5121	1730-1740	0.40 (6)	Yellow/orange spore (1)	Trace
5133	1841-1850	0.36 (7)	Yellow/orange spores	Trace
5143	1931-1940	0.35 (2) and 0.57 (4)	Green carbonate fluorescence, green/yellow resin and yellow/orange spores.	Low
5151	2003-2012	0.39 (7)	Weak mineral fluorescence, green/yellow and yellow/orange spores.	Trace
5162	2102-2111	0.37	Yellow/orange spores	Trace
5181	2273-2282	0.45 (20)	Green/yellow and yellow resins and possible yellow spores	Trace
5199	2435-2444	0.44 (20)	Yellow and yellow/orange spores	Moderate
5205	2489-2493	0.44 (21)	Yellow/orange spores	Trace

KU

VITRINITE REFLECTANCE MEASUREMENTS

TABLE NO.: 9

WELL NO. 6507/11-2

ample	Depth	Vitrinite reflectance	Fluorescence in UV light	Exinite content
5213	2561-2570	0.43 (20)	Yellow/orange spores	Trace-low
5223	2651-2660	0.41 (21)	Green/yellow and yellow spores	Trace
5233	2741-2750	0.44 (20)	Yellow/orange spores	Low
5247	2873-2882	0.50 (17)	Green/yellow resins and possible yellow/orange spores	Trace-low?

TABLE 10

R O C K   E V A L   P Y R O L Y S E S

J	DEPTH m/ft	S1	S2	S3	TOC (%)	HYDR. INDEX	OXYGEN INDEX	OIL OF GAS CONTENT S1+S2	PROD. INDEX S1 / S1+S2	TEMP. MAX (C)
33	1850	0.01	0.82	0.55	1.41	58	39	0.83	0.01	422
34	1859	0.02	0.06	0.77	0.46	13	167	0.08	0.25	429
.35	1868	0.03	0.07	0.70	0.60	12	117	0.10	0.30	431
.36	1877	0.03	0.11	1.13	0.67	16	169	0.14	0.21	420
.37	1886	0.05	0.03	0.70	0.65	5	108	0.08	0.63	425
.38	1895	0.03	1.62	0.82	1.10	147	75	1.65	0.02	418
.39	1904	0.08	0.04	0.58	0.88	5	66	0.12	0.67	426
.40	1913	0.34	45.75	1.92	10.10	453	19	46.09	0.01	418
		Sch	dk - gy - bl							
.41	1922	0.05	1.20	1.36	1.73	69	79	1.25	0.04	426
		Clst	gy							
41	1922	0.19	33.74	1.25	11.87	284	11	33.93	0.01	427
		Clst	dk - gy							
42	1931	0.40	46.97	2.05	9.22	509	22	47.37	0.01	411
		Sch	dk - gy - bl							
43	1940	0.05	0.00	0.80	0.86	0	93	0.05	1.00	
		Clst	gy - gn - gy							
43	1940	0.41	29.05	1.51	8.33	349	18	29.46	0.01	409
		Clst	gy - dk							
44	1949	0.57	39.99	1.76	5.72	699	31	40.56	0.01	408
		Sch	bl							
46	1967	0.04	0.21	1.33	0.73	29	182	0.25	0.16	420
47	1976	0.05	0.17	0.85	0.86	20	99	0.22	0.23	420
		Clst	gy - dk - gy							
48	1985	0.02	0.11	1.10	0.66	17	167	0.13	0.15	425
49	1994	0.10	4.28	1.38	2.46	174	56	4.38	0.02	418
		Clst	dk - gy							
50	2003	0.07	0.68	1.75	0.97	70	180	0.75	0.09	418
51	2012	0.01	11.80	1.49	4.94	239	30	11.81	0.00	414
		Clst	dk - gy							
59	2084	0.05	0.00	1.03	0.58	0	178	0.05	1.00	
99	2444	0.02	61.82	6.87	56.32	110	12	61.84	0.00	423
03	2480	0.22	8.66	1.00	9.65	90	10	8.88	0.02	421

DATE : 30 - 8 - 82.

TABLE 10

R O C K E V A L P Y R O L Y S E S

	DEPTH m/ft	S1	S2	S3	TOC (%)	HYDR. INDEX	OXYGEN INDEX	OIL OF GAS CONTENT S1+S2	PROD. INDEX S1/S1+S2	TEMP. MAX (C)
05	2498	0.10	22.19	1.67	17.22	129	10	22.29	0.00	422
07	2516	0.12	15.81	0.98	9.41	168	10	15.93	0.01	422
09	2534	0.30	26.00	1.64	17.27	151	9	26.30	0.01	420
11	2552	0.06	17.45	1.23	13.02	134	9	17.51	0.00	423
13	2570	0.08	20.74	1.51	13.59	153	11	20.82	0.00	420
15	2588	0.15	14.99	0.96	10.22	147	9	15.14	0.01	427
23	2660	0.43	56.47	3.63	44.19	128	8	56.90	0.01	415
25	2678	0.24	23.58	1.81	18.58	127	10	23.82	0.01	424
27	2696	0.52	24.80	1.62	19.76	126	8	25.32	0.02	424
29	2714	0.13	14.01	1.07	10.35	135	10	14.14	0.01	423
		Clst	dk – gy							
33	2750	0.55	18.20	1.90	14.32	127	13	18.75	0.03	424
		Clst	dk – gy							
35	2768	0.10	0.53	0.61	1.60	33	38	0.63	0.16	428
		Clst	dk – gy							
37	2786	0.11	2.35	0.93	2.90	81	32	2.46	0.04	427
		Clst	brn – gy							
39	2804	0.07	1.73	1.27	2.53	68	50	1.80	0.04	432
		Clst	brn – gy							
45	2864	0.03	2.84	0.23	2.75	103	8	2.87	0.01	444
		Clst	gy – dk – gy							
47	2882	0.17	2.51	0.32	2.65	95	12	2.68	0.06	443
		Clst	gy – dk – gy							

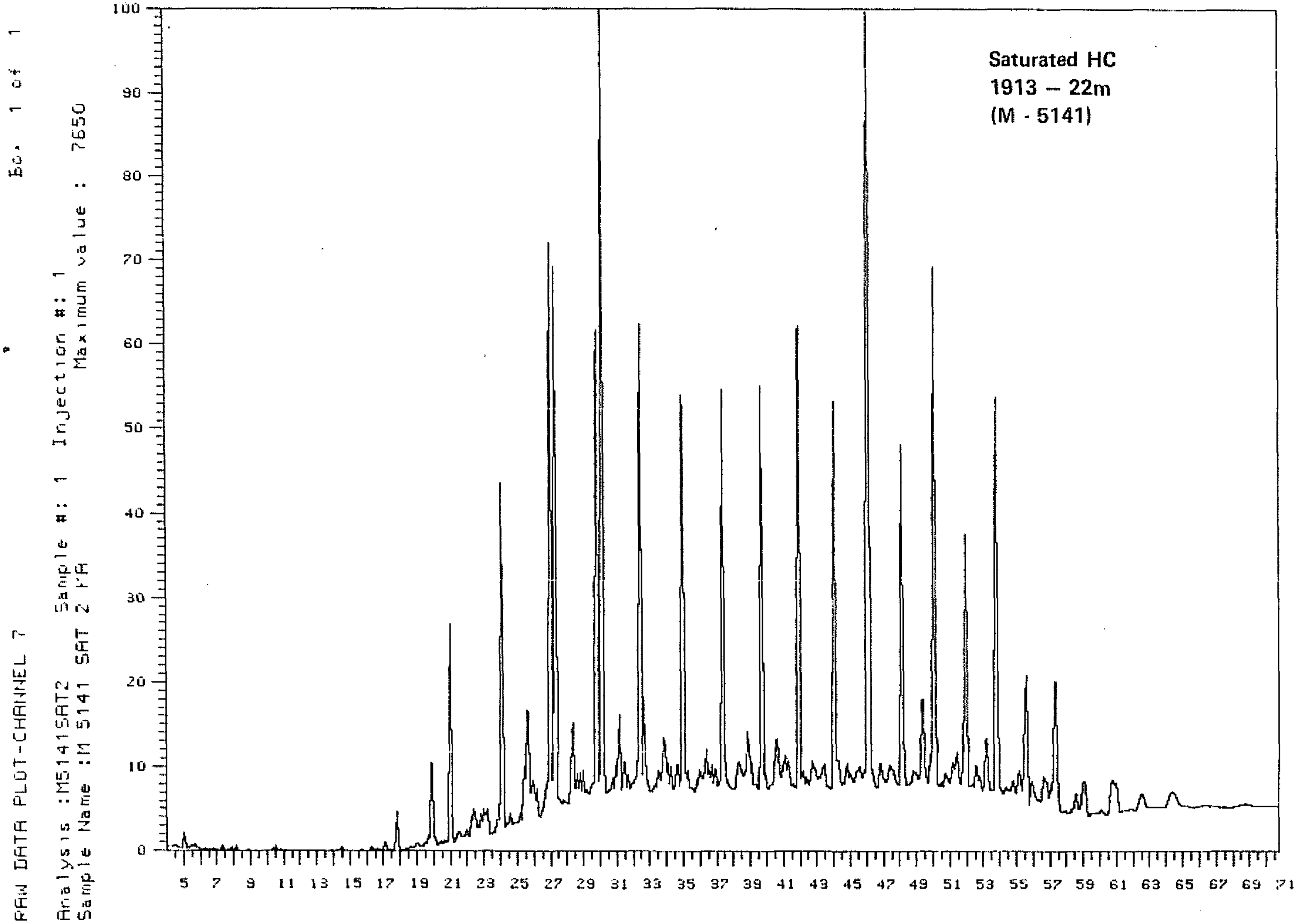
DATE : 1 - 10 - 82.

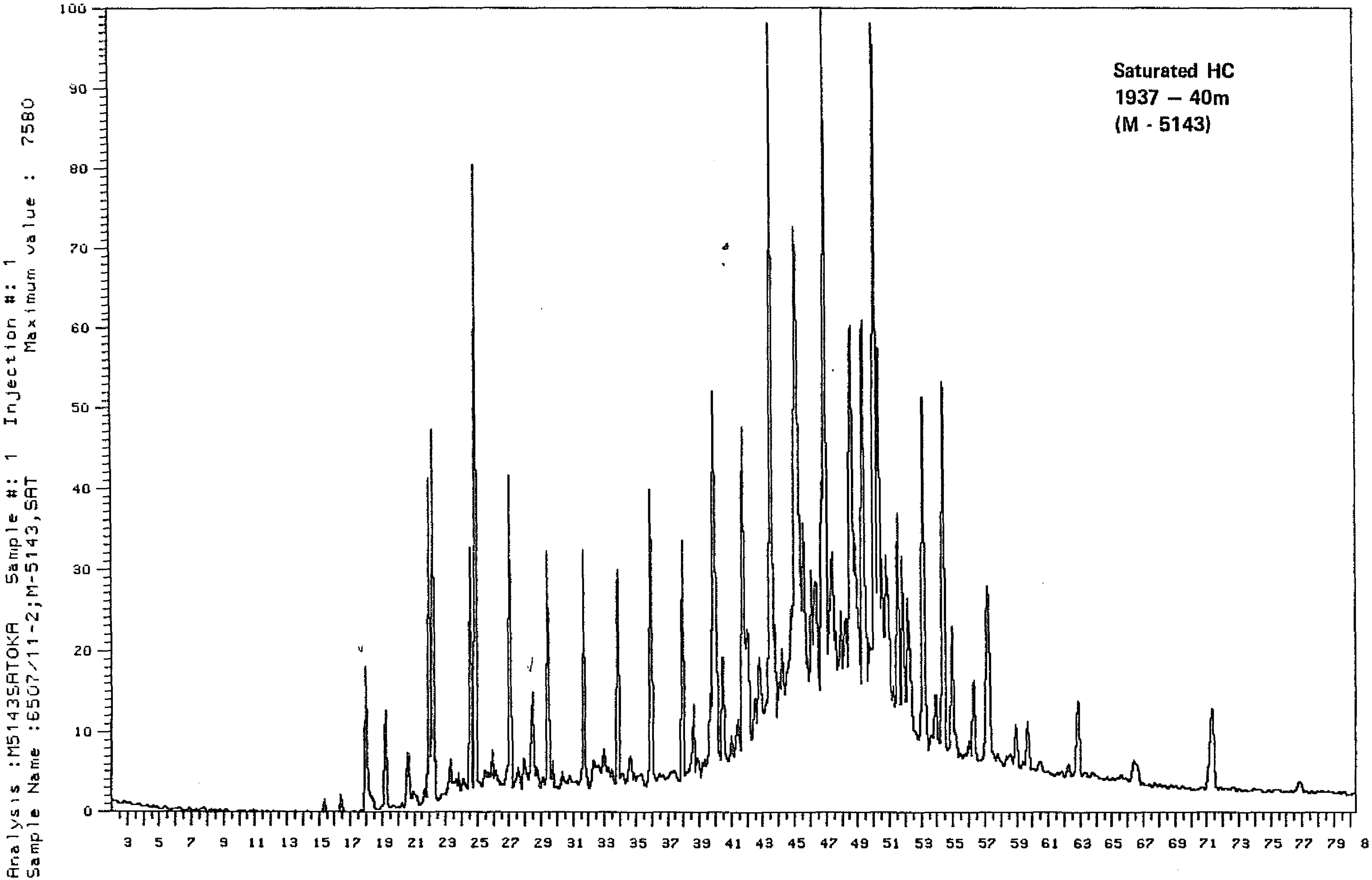
Table 11. Molecular parameters calculated from GC-MS chromatograms.

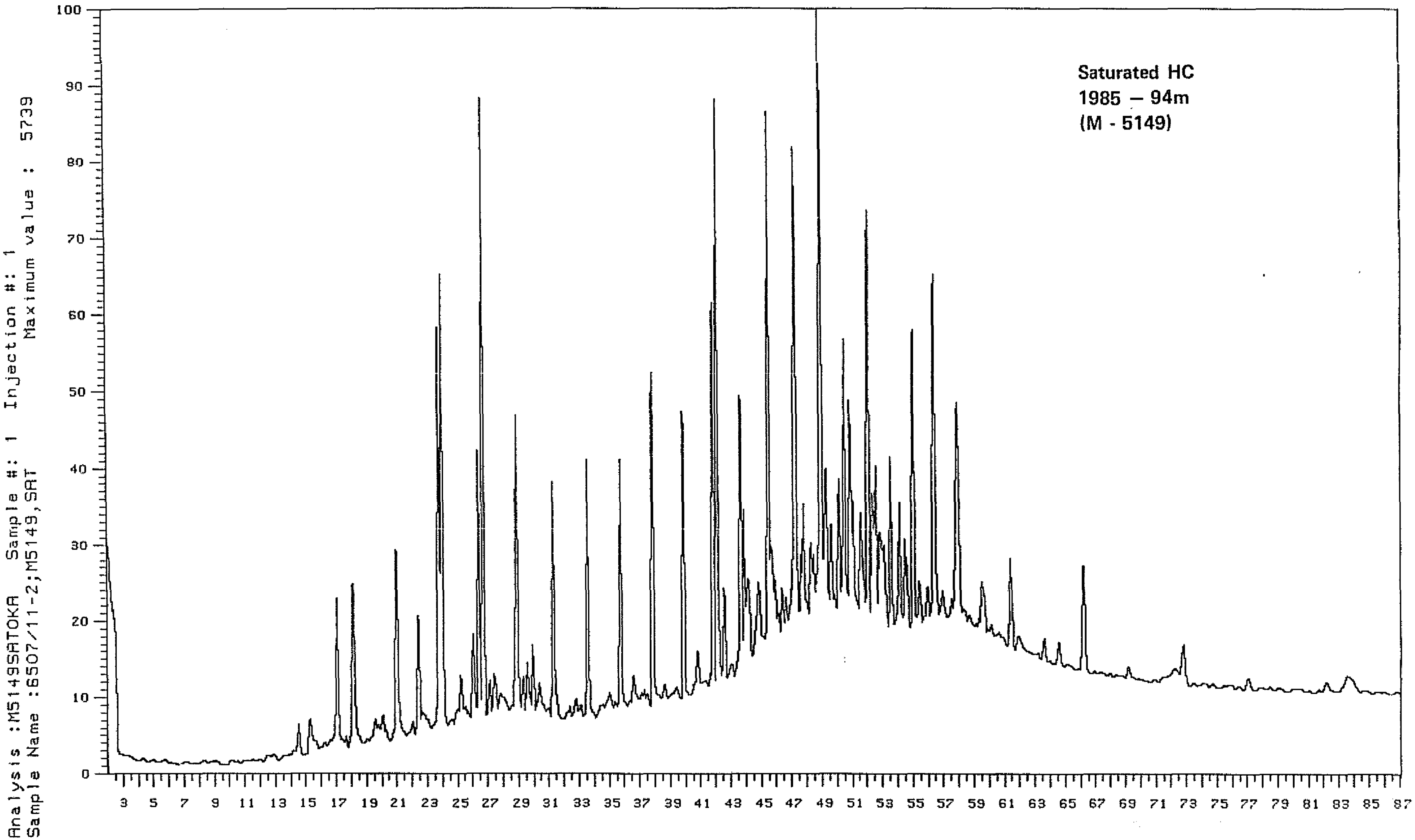
Sample	Triterpanes m/e 191 %22S/22R+22R 1)	%ββ 2)	βα/αβ 3)	Aromatic steranes m/c 253 %side chain cracking 4)
M-5143	11	49	0.31	52
M-5203	8	43	0.30	36
M-5215	12,5	42	0.33	29

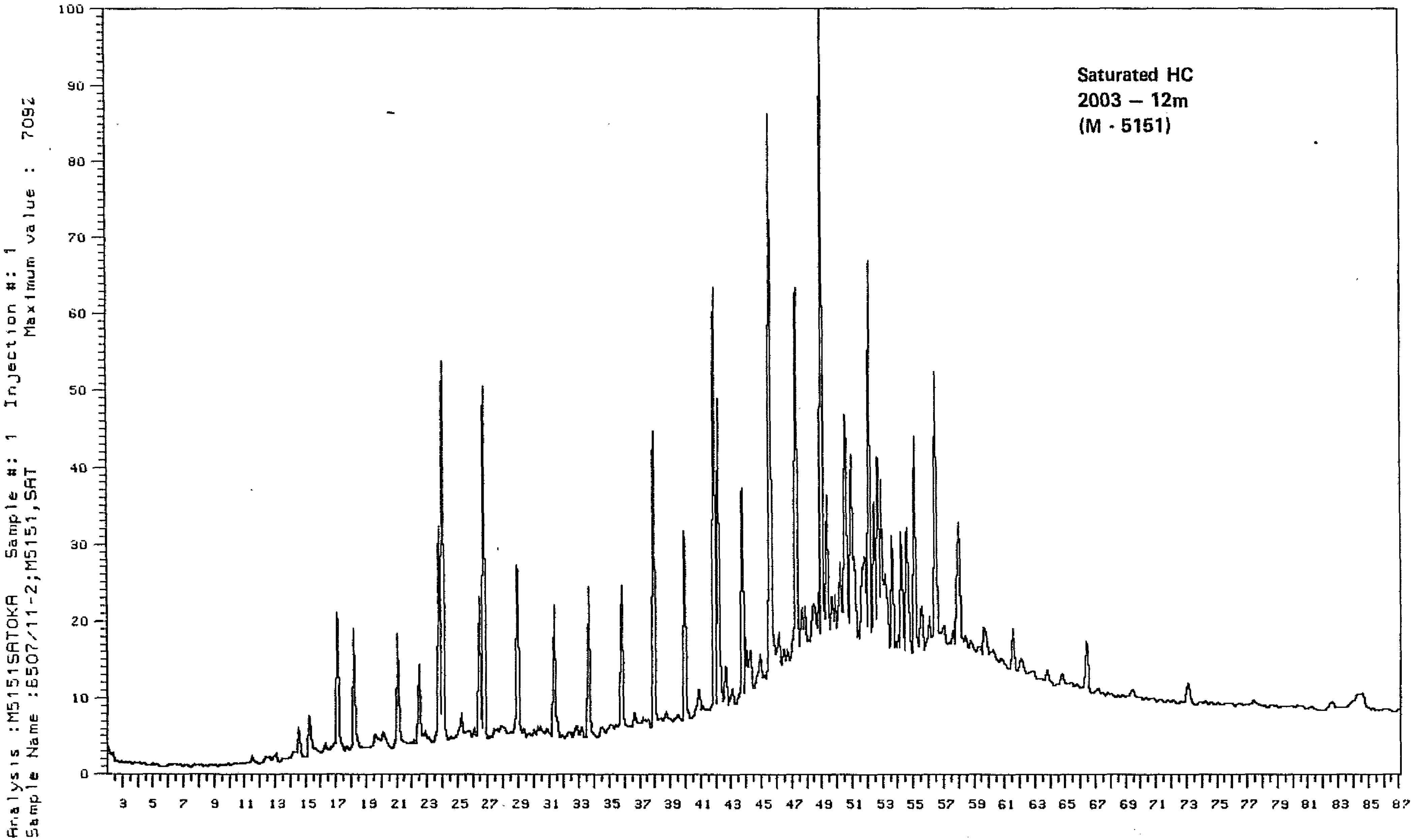
1) %22S in 14α (H), 17β (H)-homohopane (A/A+B, i M/E 191 Chromatogram).
2) %14β (H), 17β (H)-homohopane of total homohopanes (E/A+B+D+E,i M/E 191 Chromatogram).
3) 14β (H), 17α (H)-homohopane/14α (H), 17β (H)-homohopanes (D/A+B, i M/E 191 Chromatogram).
4) %C_{21}-monoaromatic/C_{21}monoaromatic + C_{28}, C_{29}-monoaromatic (M_1/M_1+O_1,i M/E 253 Chromatogram).

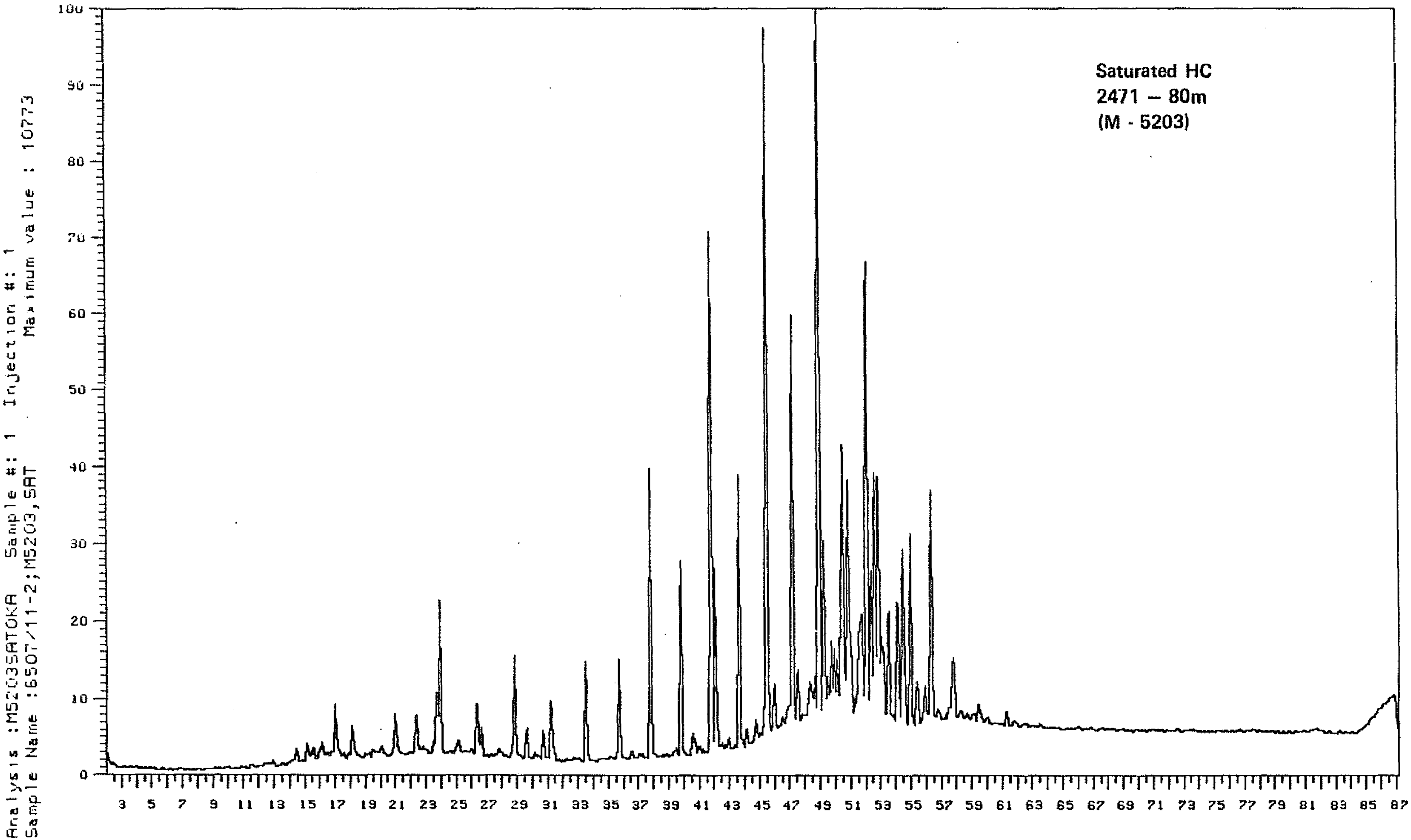
SATURATED HYDROCARBON GAS CHROMATOGRAMS

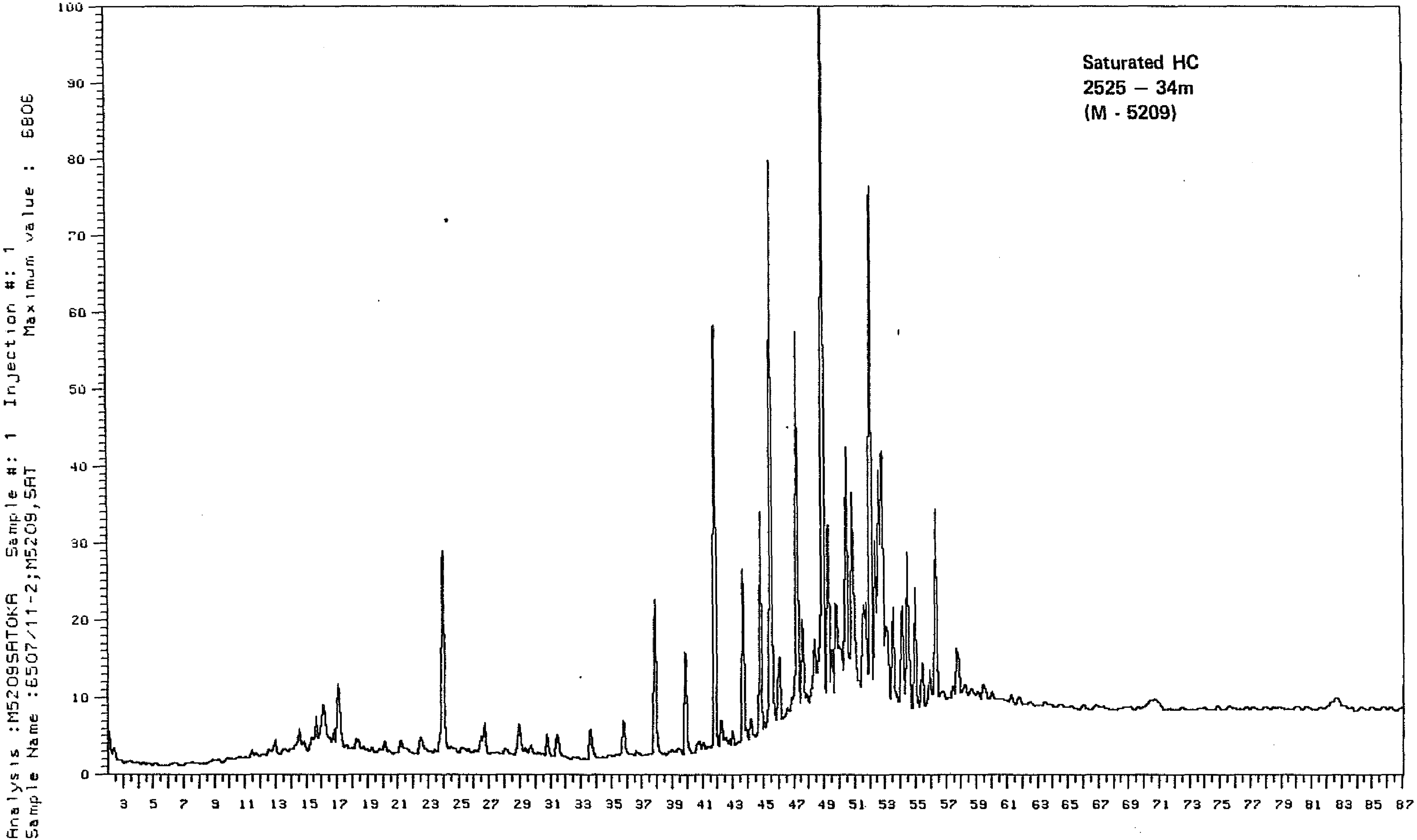

RAW DATA PLOT-CHANNEL 7
Pg. 1 of 1
Analysis :M5141SAT2 Sample #: 1 Injection #: 1
Sample Name :M 5141 SAT 2 YA Maximum value : 7650
Saturated HC
1913 – 22m
(M - 5141)

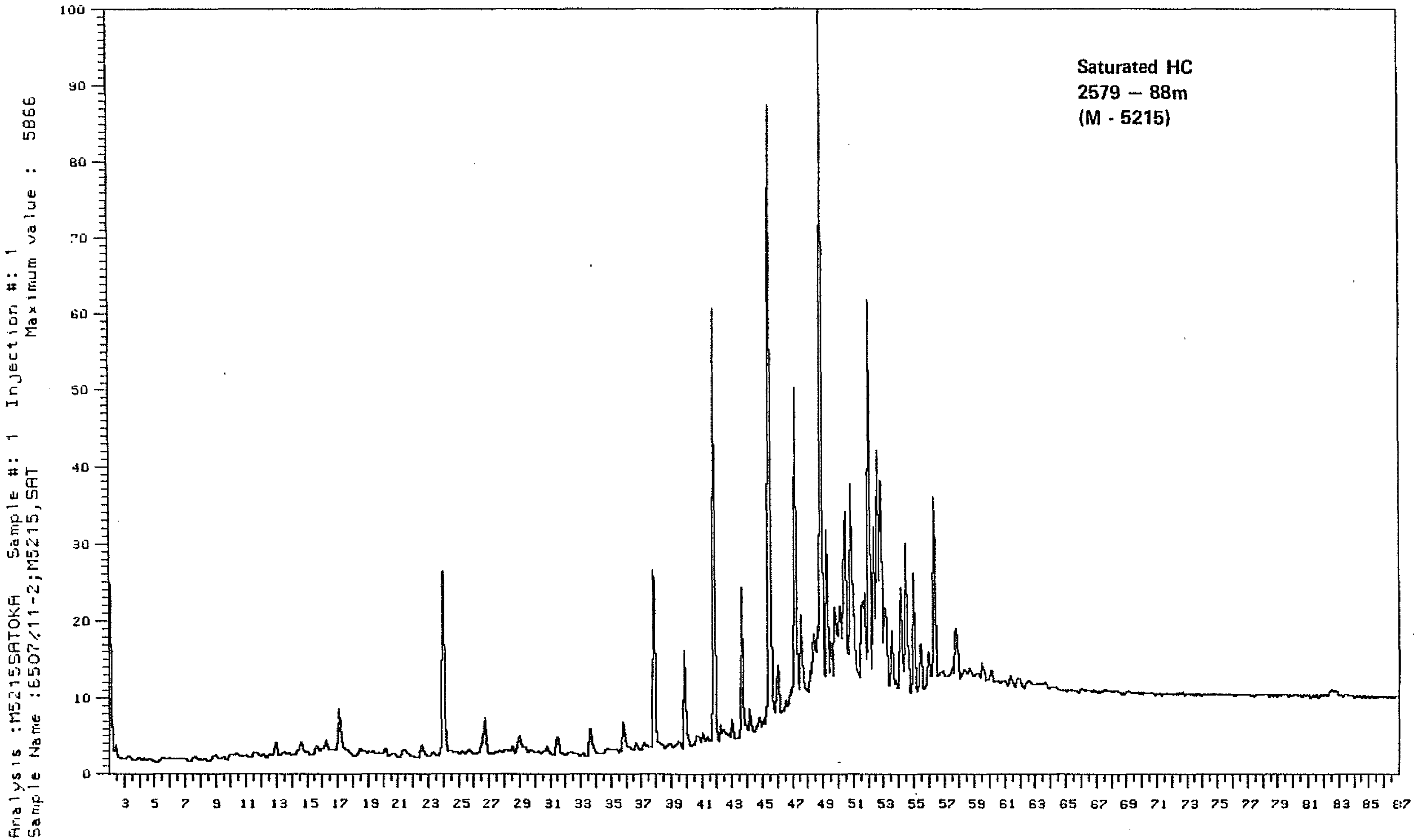

Saturated HC
1937 – 40m
(M - 5143)
Analysis :M5143SATOKA Sample #: 1 Injection #: 1
Sample Name :6507/11-2;M-5143,SAT Maximum value : 7580
0
10
20
30
40
50
60
70
80
90
100
3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51 53 55 57 59 61 63 65 67 69 71 73 75 77 79

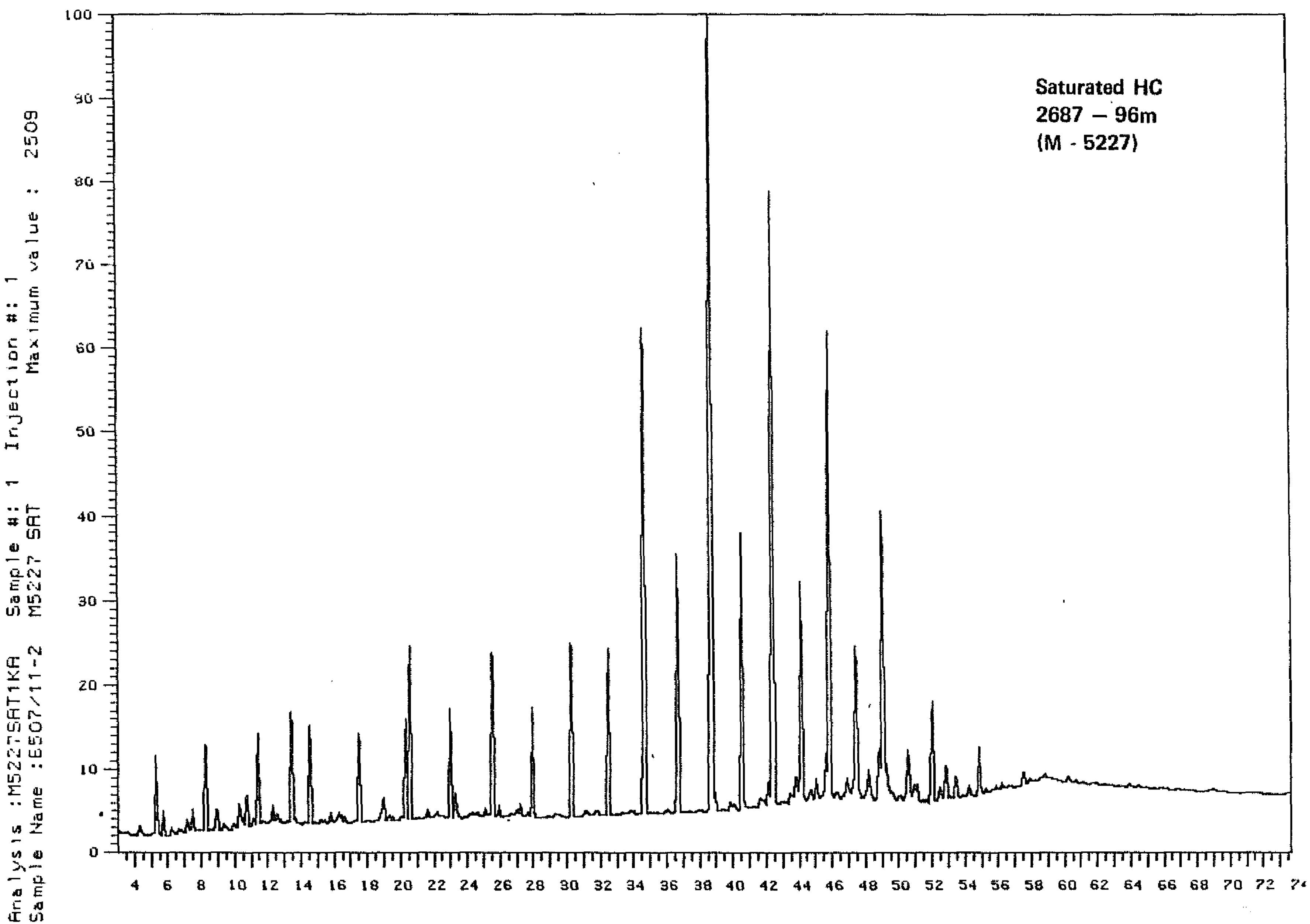

Saturated HC
1985 – 94m
(M - 5149)
Analysis :M5149SATOKA Sample #: 1 Injection #: 1
Sample Name :6507/11-2;M5149,SAT Maximum value : 5739
0 10 20 30 40 50 60 70 80 90 100
3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51 53 55 57 59 61 63 65 67 69 71 73 75 77 79 81 83 85 87

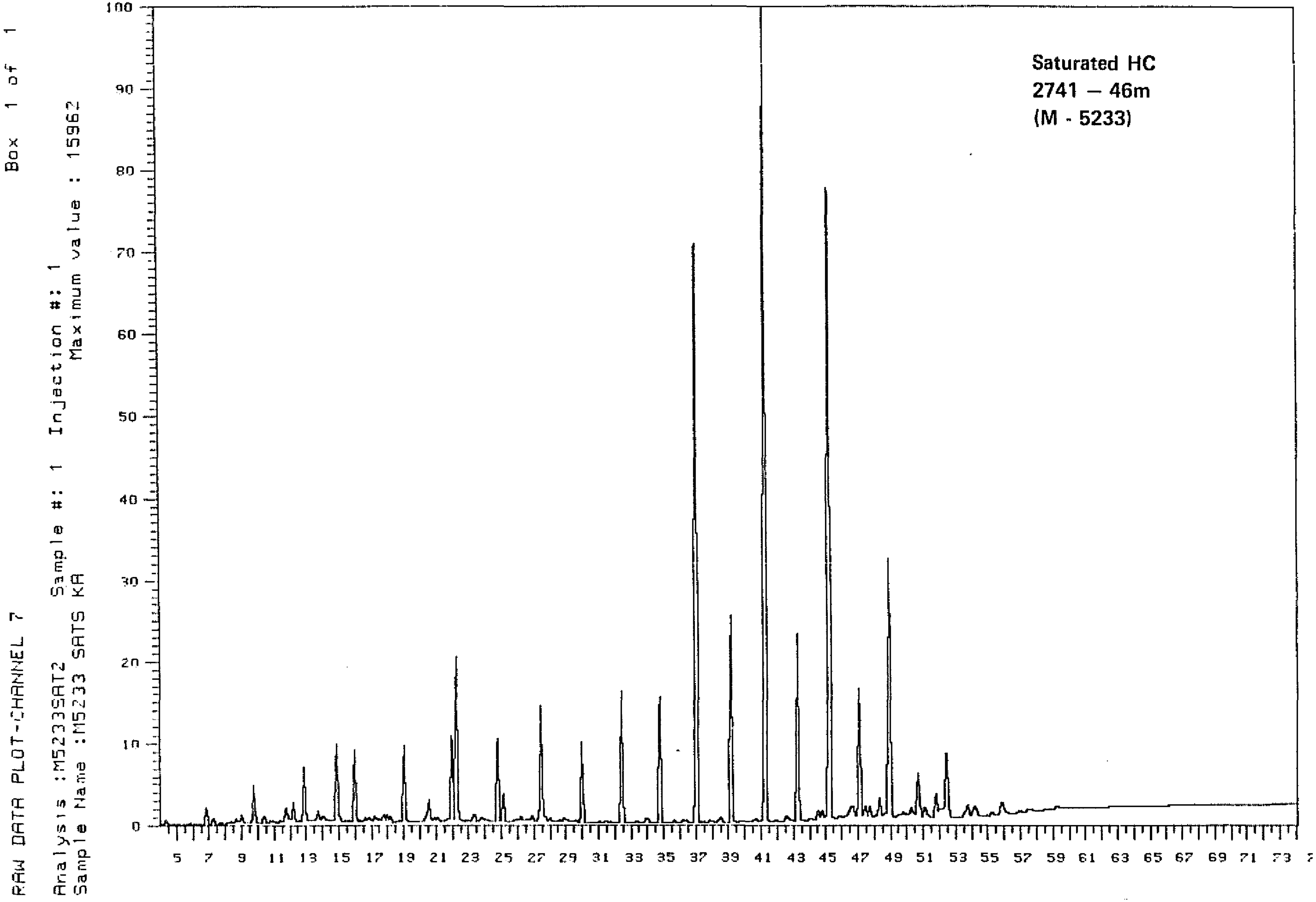

Saturated HC
2003 – 12m
(M - 5151)
Analysis :M5151SATOKA Sample #: 1 Injection #: 1
Sample Name :E507/11-2;M5151,SAT Maximum value : 7092
0 10 20 30 40 50 60 70 80 90 100
3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51 53 55 57 59 61 63 65 67 69 71 73 75 77 79 81 83 85 87


Analysis :M5203SATOKA   Sample #: 1   Injection #: 1
Sample Name :6507/11-2;M5203,SAT   Maximum value : 10773
Saturated HC
2471 – 80m
(M - 5203)
100
90
80
70
60
50
40
30
20
10
0
3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51 53 55 57 59 61 63 65 67 69 71 73 75 77 79 81 83 85 87

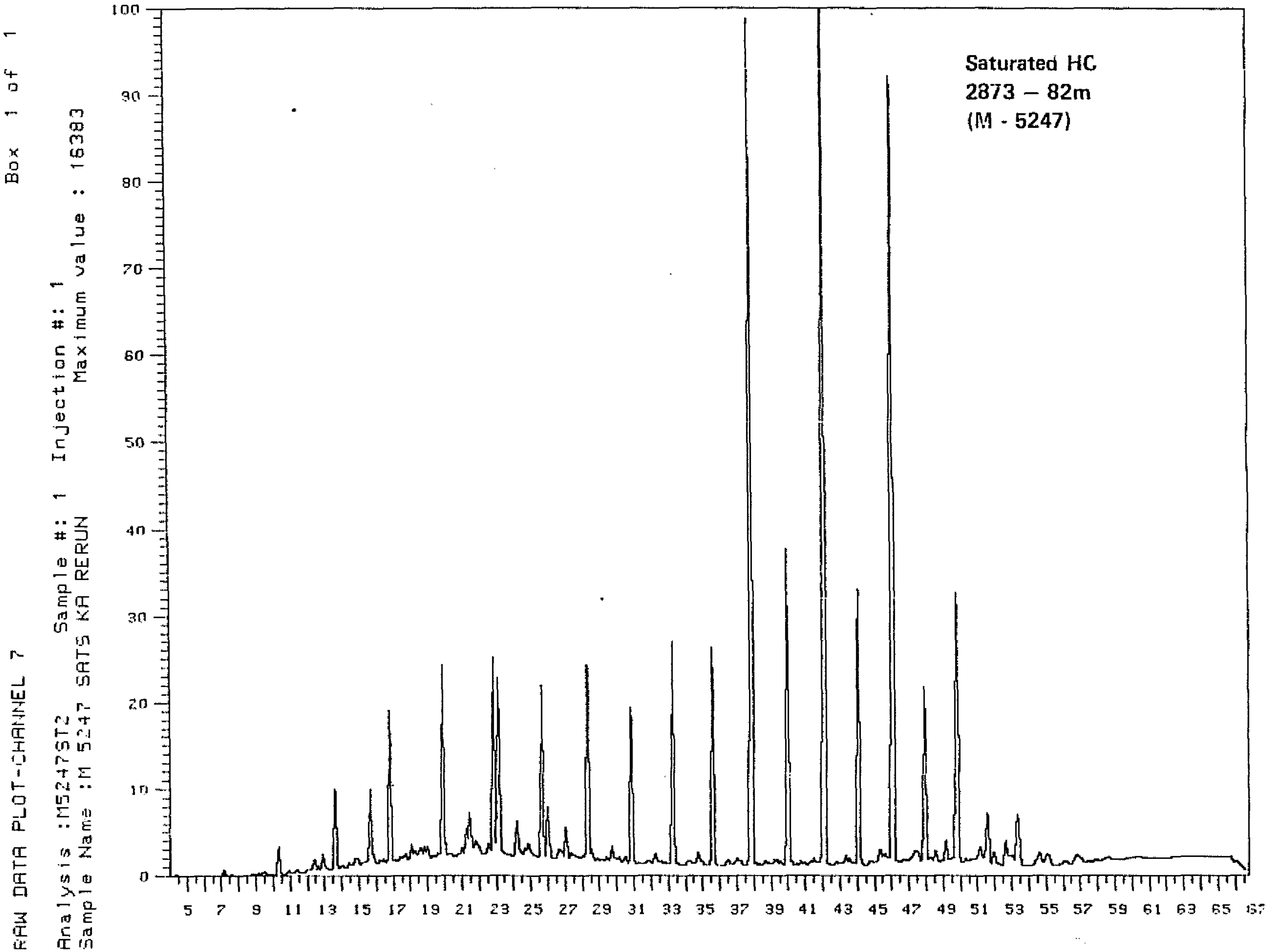

Saturated HC
2525 — 34m
(M - 5209)
Analysis :M5209SATOKA Sample #: 1 Injection #: 1
Sample Name :6507/11-2;M5209,SAT Maximum value : 6806


Saturated HC
2579 – 88m
(M - 5215)
Analysis :M5215SATOKA Sample #: 1 Injection #: 1
Sample Name :6507/11-2;M5215,SAT Maximum value : 5866


Saturated HC
2687 – 96m
(M - 5227)
Analysis :M5227SAT1KA Sample #: 1 Injection #: 1
Sample Name :E507/11-2 M5227 SAT Maximum value : 2509



RAW DATA PLOT-CHANNEL 7
Analysis :M5233SAT2 Sample #: 1 Injection #: 1
Sample Name :M5233 SATS KA Maximum value : 15962
Box 1 of 1
Saturated HC
2741 — 46m
(M - 5233)



RAW DATA PLOT-CHANNEL 7
Box 1 of 1
Analysis :M5247ST2
Sample #: 1
Injection #: 1
Sample Name :M 5247 SATS KA RERUN
Maximum value : 16383
Saturated HC
2873 – 82m
(M - 5247)
100
90
80
70
60
50
40
30
20
10
0
5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51 53 55 57 59 61 63 65 67

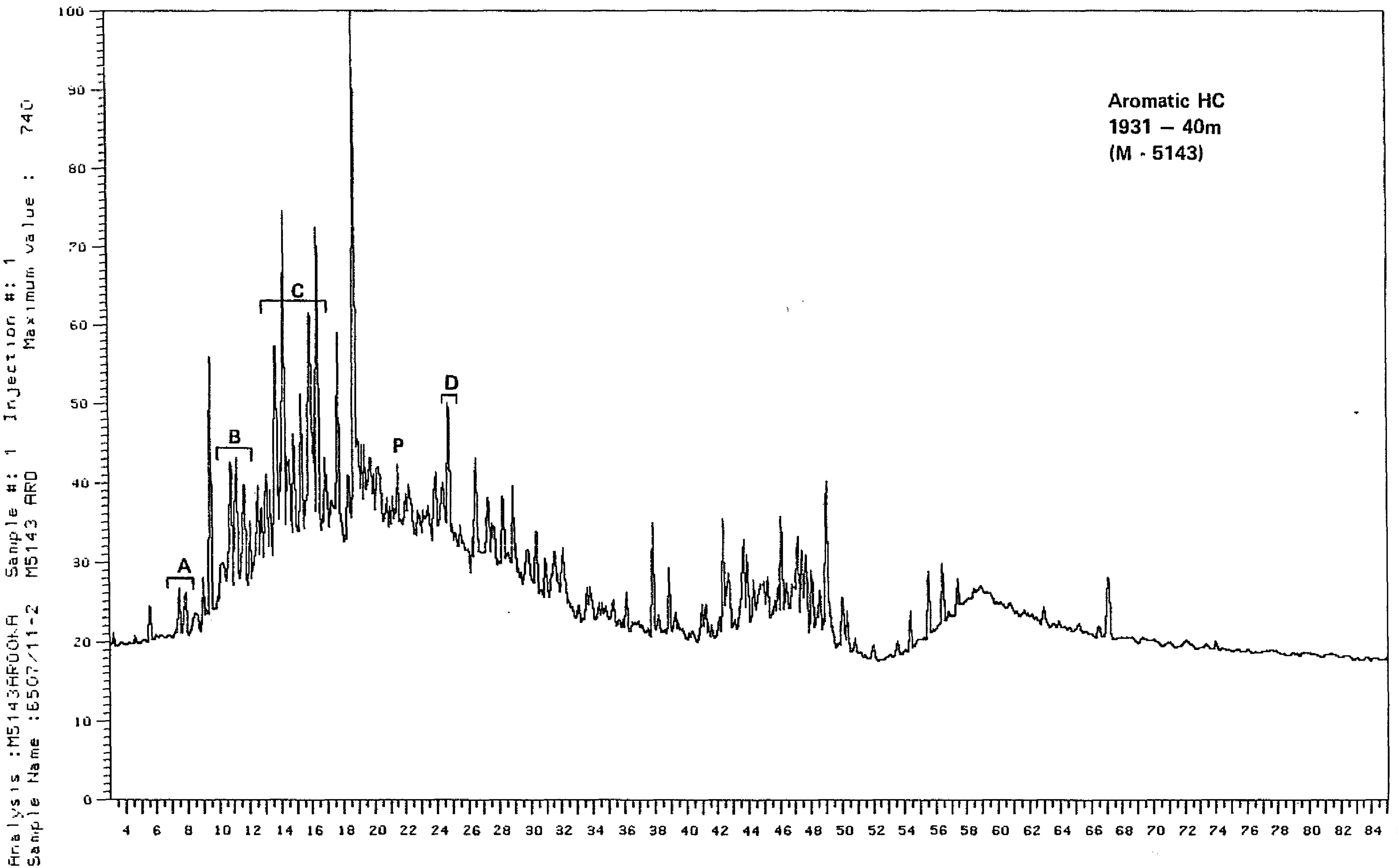
AROMATIC AND BRANCHED CYCLIC HYDROCARBONS.
GAS CHROMATOGRAMS

Aromatic Gas Chromatograms:-

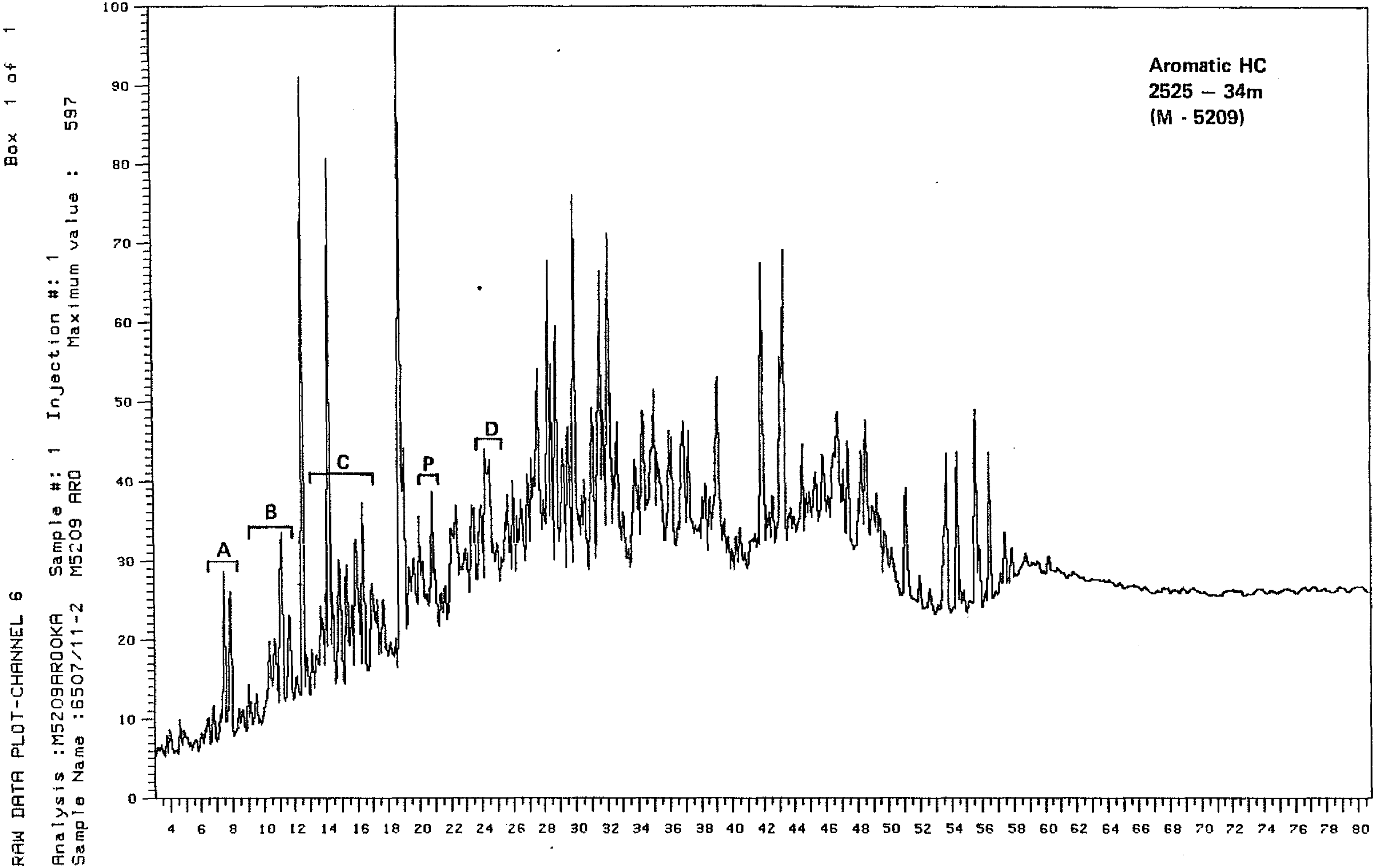
A, B, C	=	ALKYL NAPHTHALENES
D	=	UNIDENTIFIED COMPOUNDS OCCURING ABOVE THE METHYL PHENANTHRENES.
P	=	PHENANTHRENE

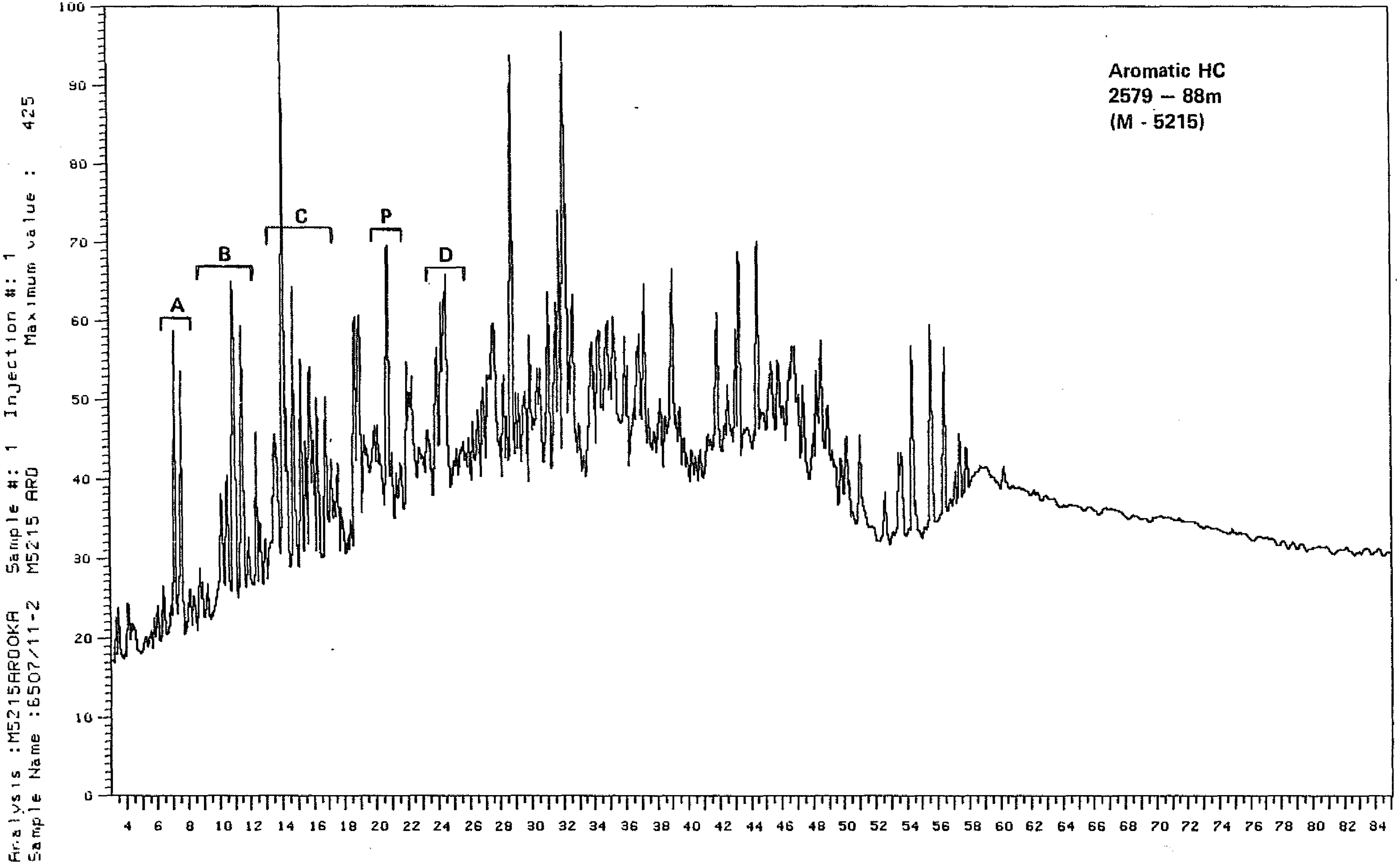
Branched/Cyclic Gas Chromatograms:-

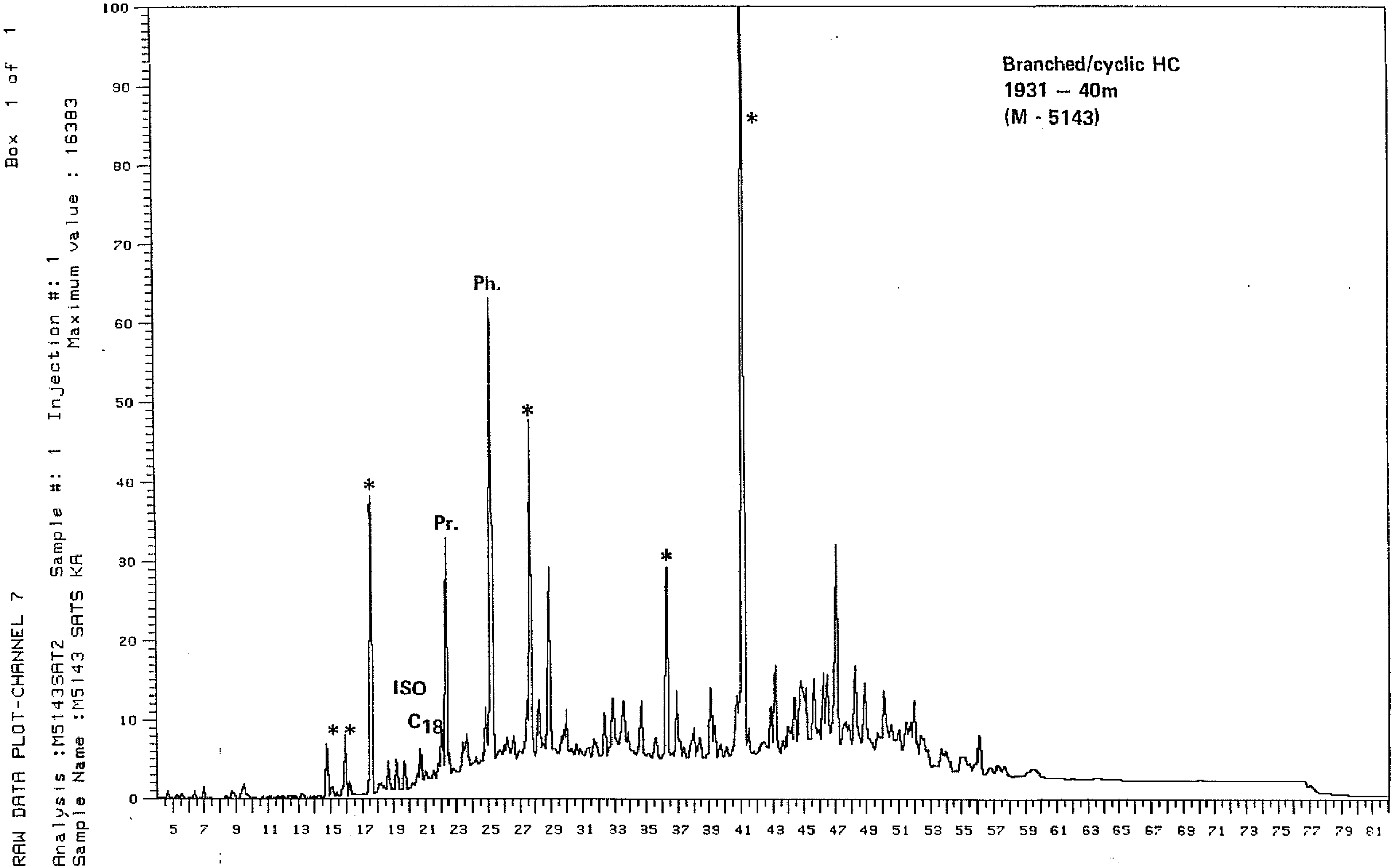
Pr	=	PRISTANE
Ph	=	PHYTANE
iso-C_{18}	=	C_{18} ACYCLIC ISOPRENOID
*	=	PHTHALATES
**	=	TRI-N-BUTYLPHOSPHATE



Aromatic HC
1931 – 40m
(M - 5143)
Analysis :M5143AR00k.A   Sample #: 1   Injection #: 1
Sample Name :E507/11-2   M5143 ARO   Maximum value : 740
A
B
C
P
D


RAW DATA PLOT-CHANNEL 6
Analysis :M5209AROOKA Sample #: 1 Injection #: 1 Box 1 of 1
Sample Name :6507/11-2 M5209 ARO Maximum value : 597
Aromatic HC
2525 – 34m
(M - 5209)
A
B
C
P
D
0
10
20
30
40
50
60
70
80
90
100
4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72 74 76 78 80

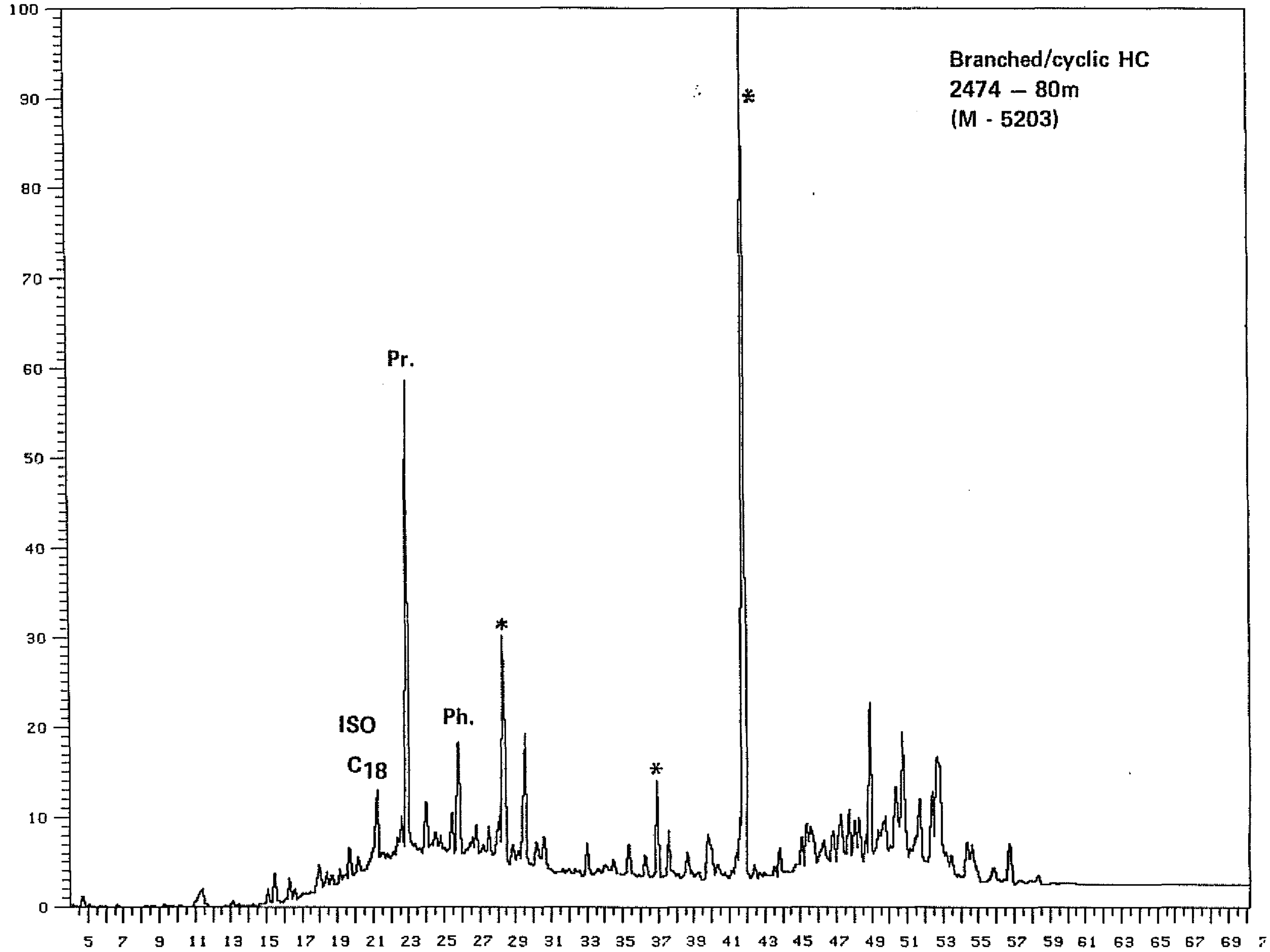

Aromatic HC
2579 — 88m
(M - 5215)
A
B
C
P
D
Analysis :M5215AROOKA Sample #: 1 Injection #: 1
Sample Name :6507/11-2 M5215 ARO Maximum value : 425

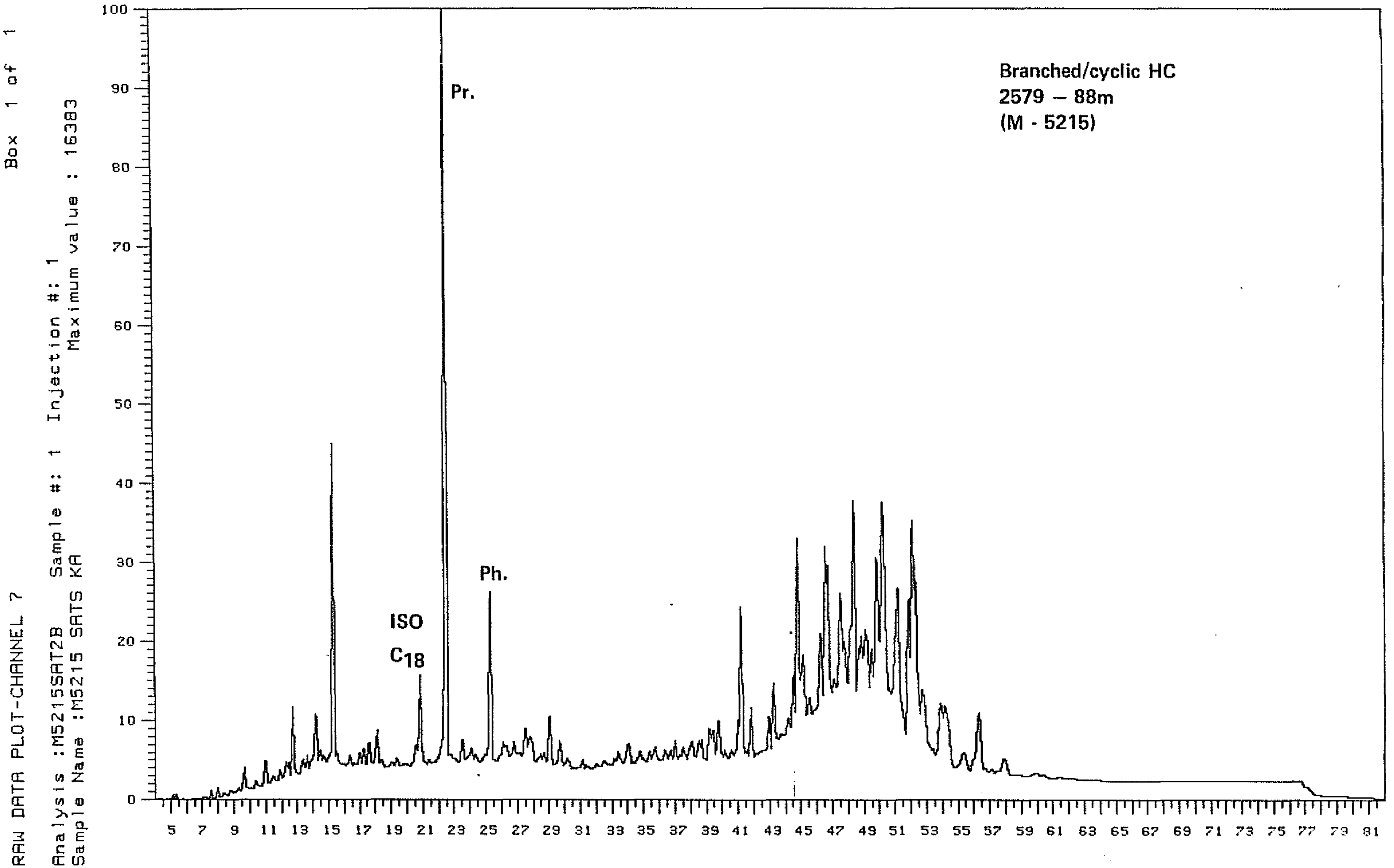

RAW DATA PLOT-CHANNEL 7
Sample #: 1
Injection #: 1
Box 1 of 1
Analysis :M5143SAT2
Sample Name :M5143 SATS KA
Maximum value : 16383
Branched/cyclic HC
1931 – 40m
(M - 5143)
Ph.
Pr.
ISO
C_{18}
*

RAW DATA PLOT-CHANNEL 7

Analysis :M5203SAT2 Sample #: 1 Injection #: 1 Box 1 of 1

Sample Name :M 5203 SAT 2 KA Maximum value : 16383

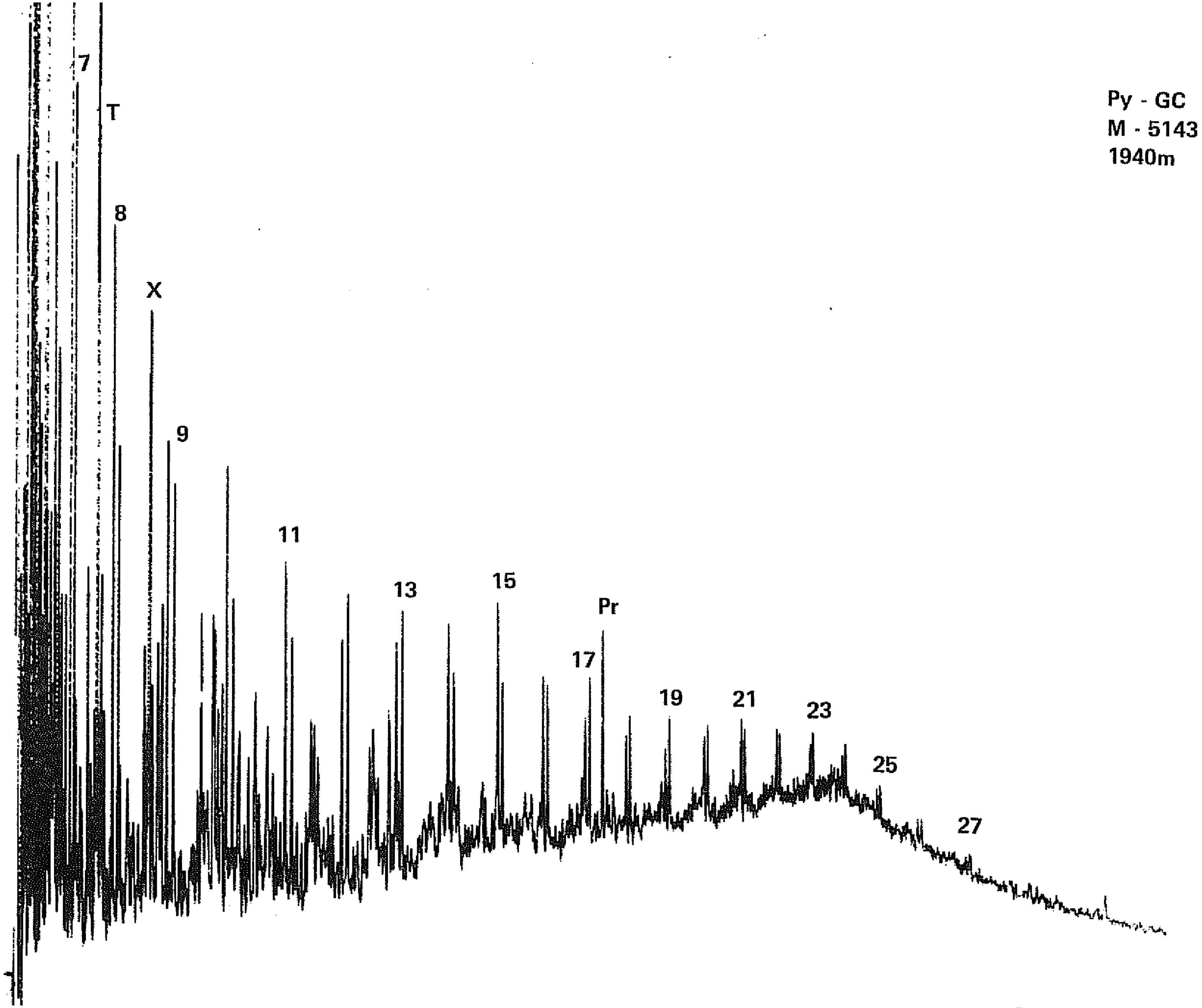



RAW DATA PLOT-CHANNEL 7
Box 1 of 1
Analysis :M5215SAT2B Sample #: 1 Injection #: 1
Sample Name :M5215 SATS KA Maximum value : 16383
Branched/cyclic HC
2579 – 88m
(M - 5215)
Pr.
Ph.
ISO
C18

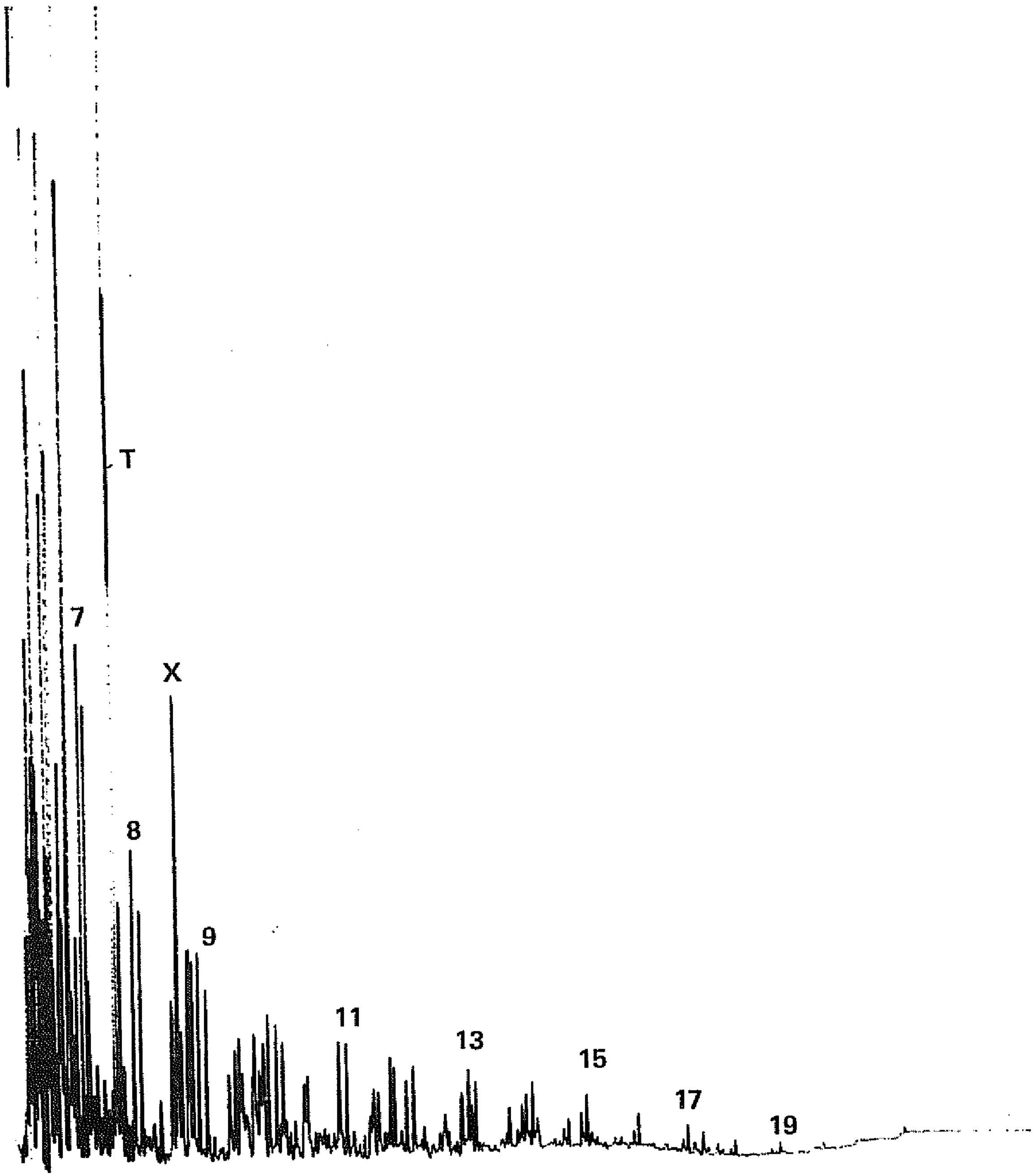
PYROLYSIS - GAS CHROMATOGRAMS

AND

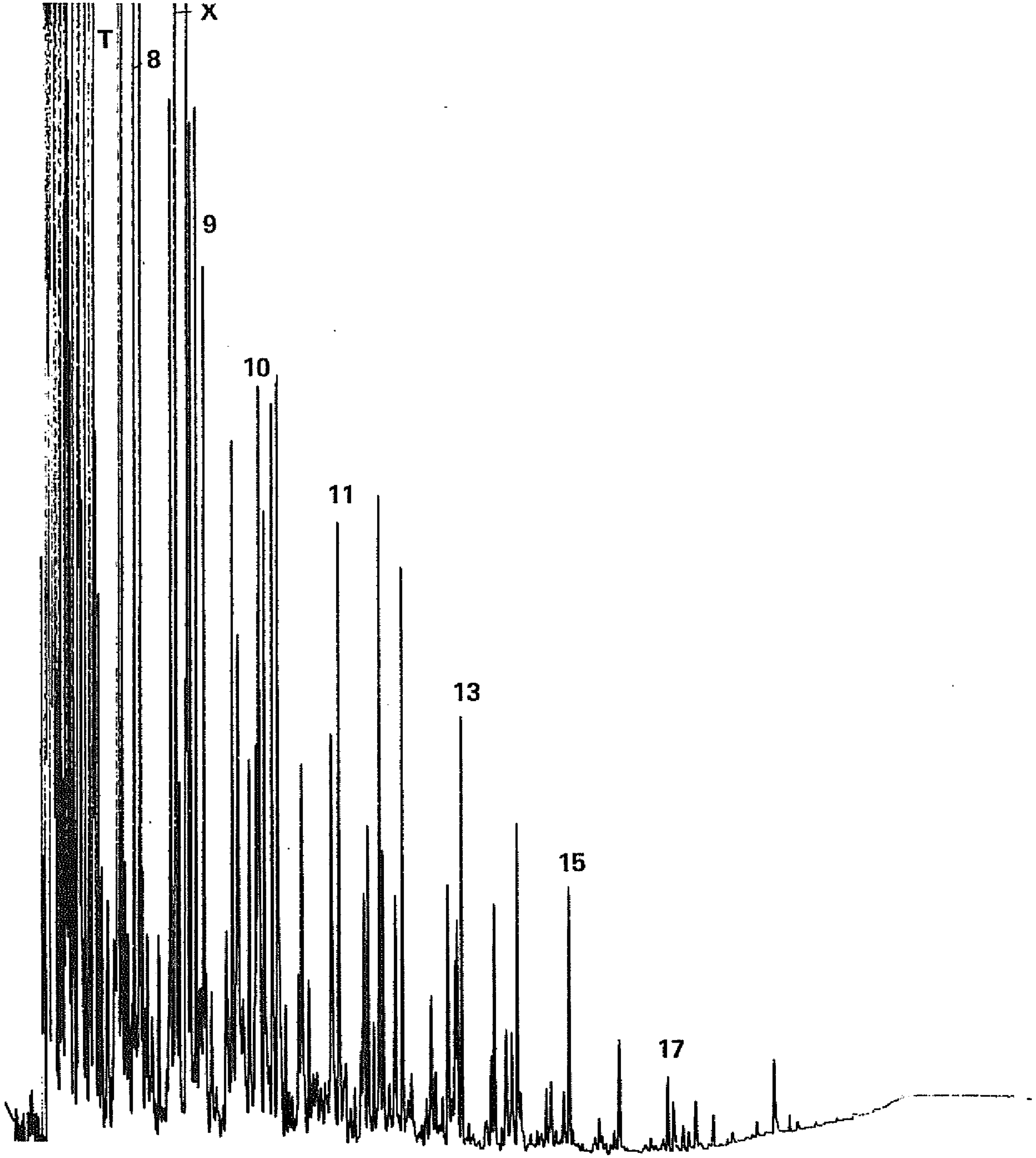
THERMOEXTRACTIONS

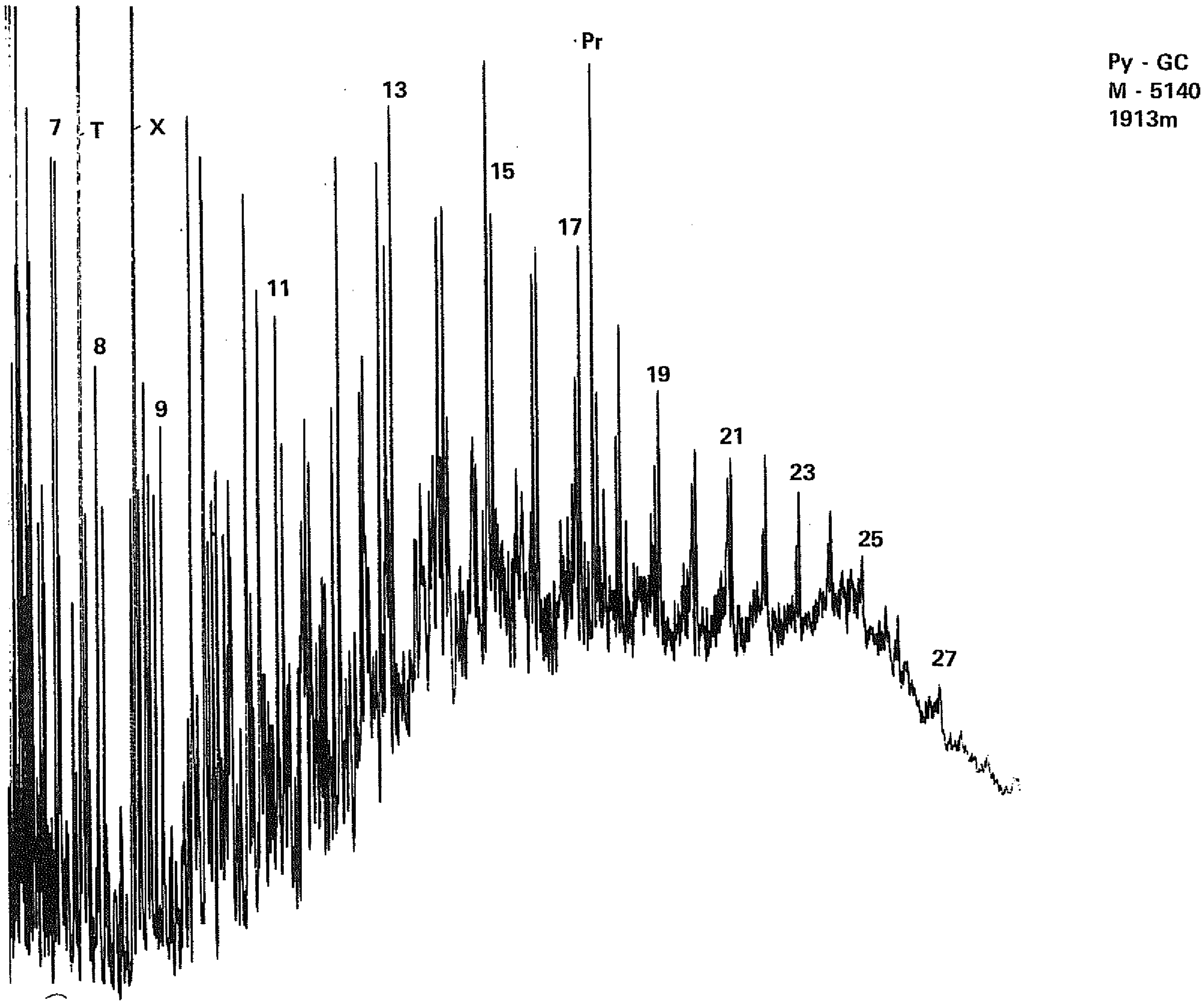


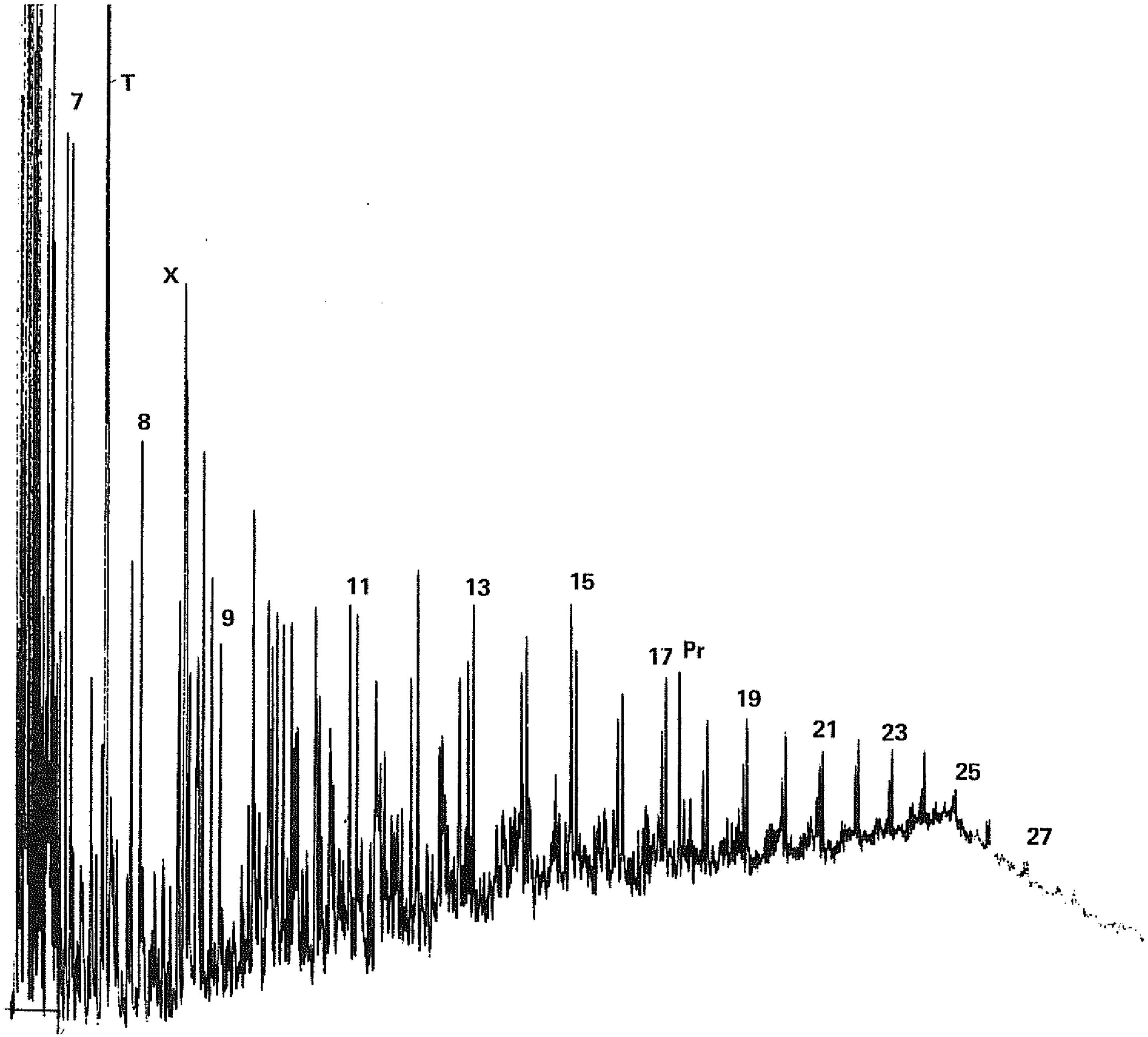
Py - GC
M - 5143
1940m
7
T
8
X
9
11
13
15
Pr
17
19
21
23
25
27



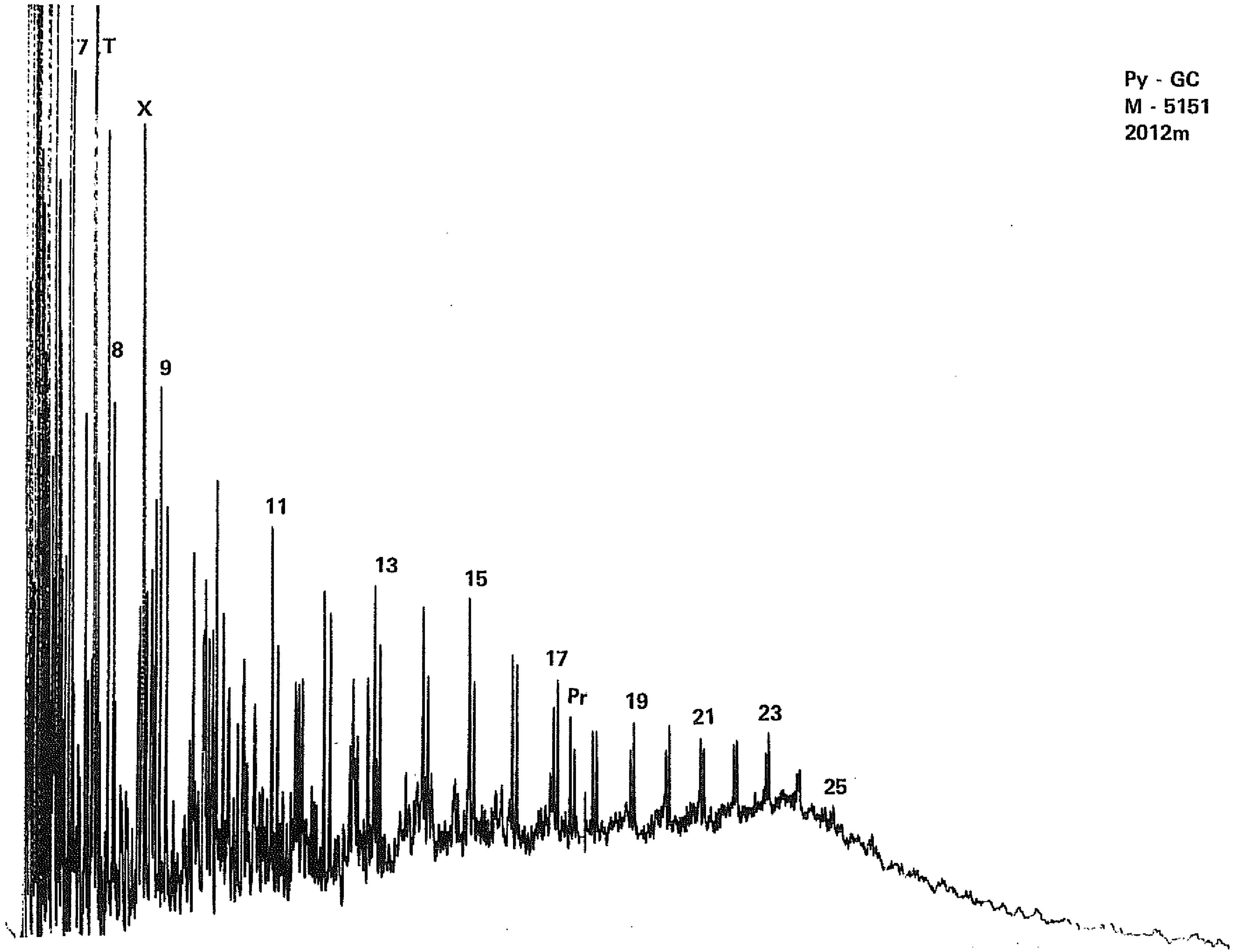
Py - GC
M - 5149
1994m


T
8
X
9
10
11
13
15
17
Py - GC
M - 5136
1877m

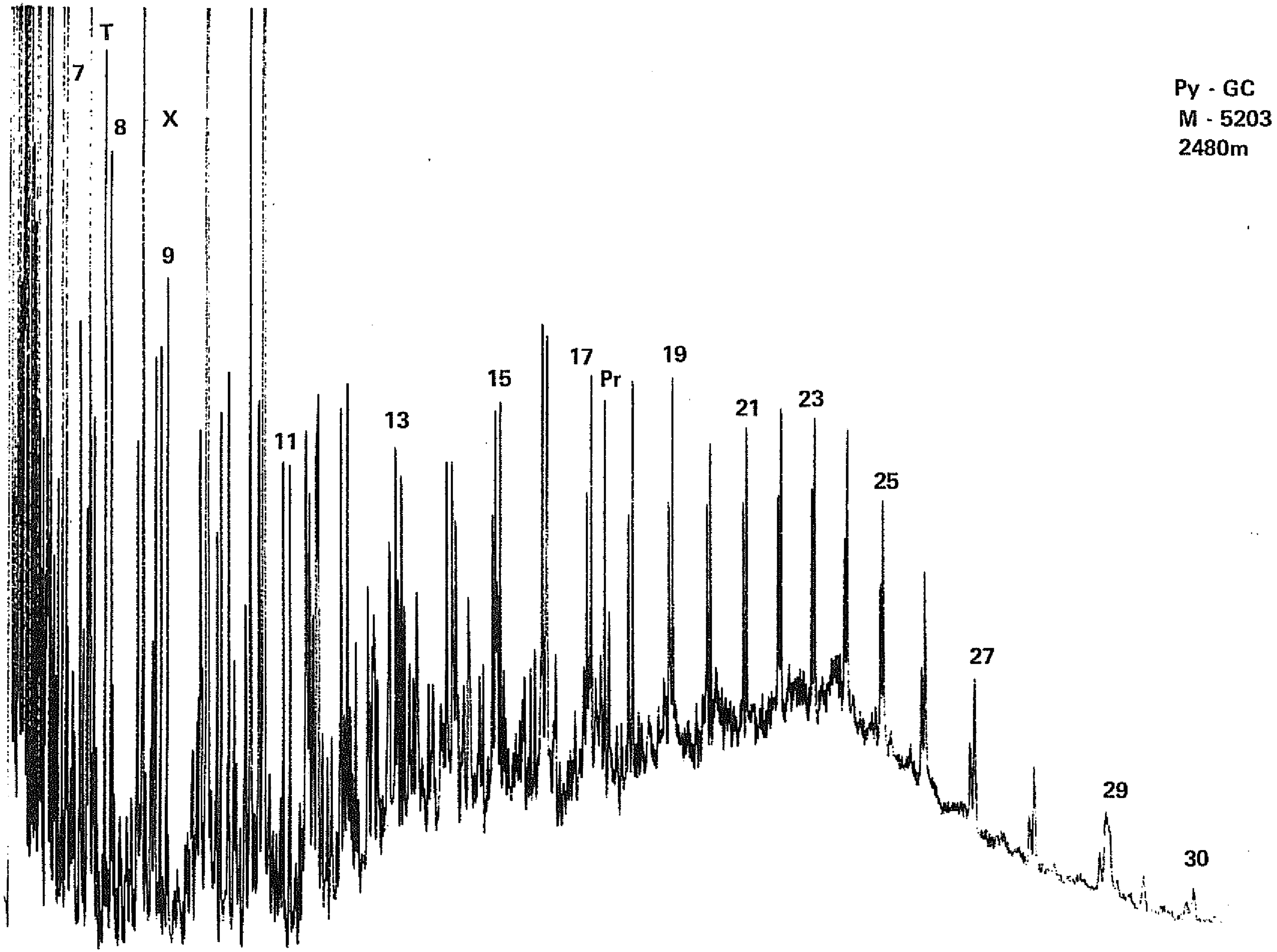

Py - GC
M - 5140
1913m
7
T
X
8
9
11
13
15
Pr
17
19
21
23
25
27

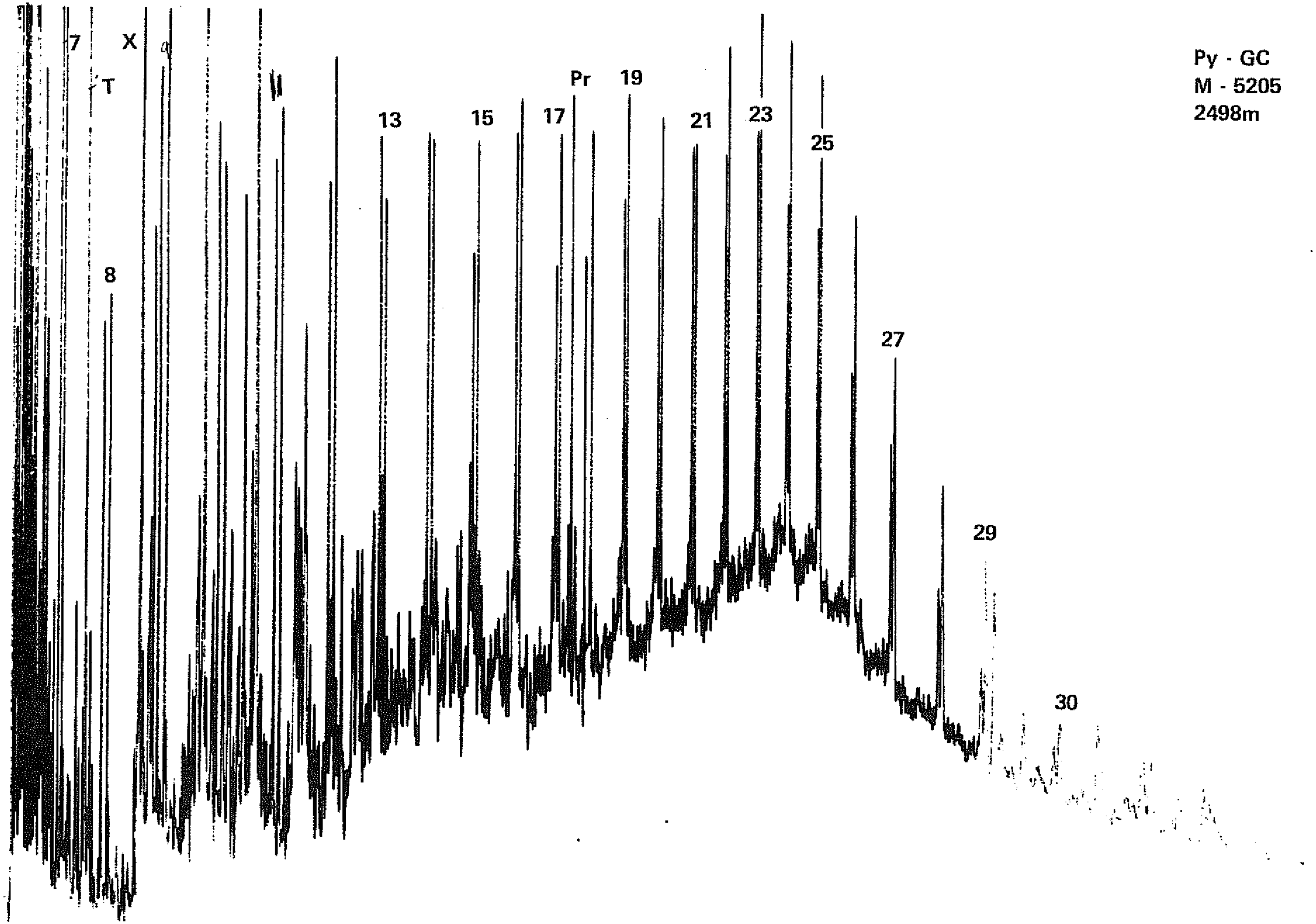


Py - GC
M - 5141
1922m

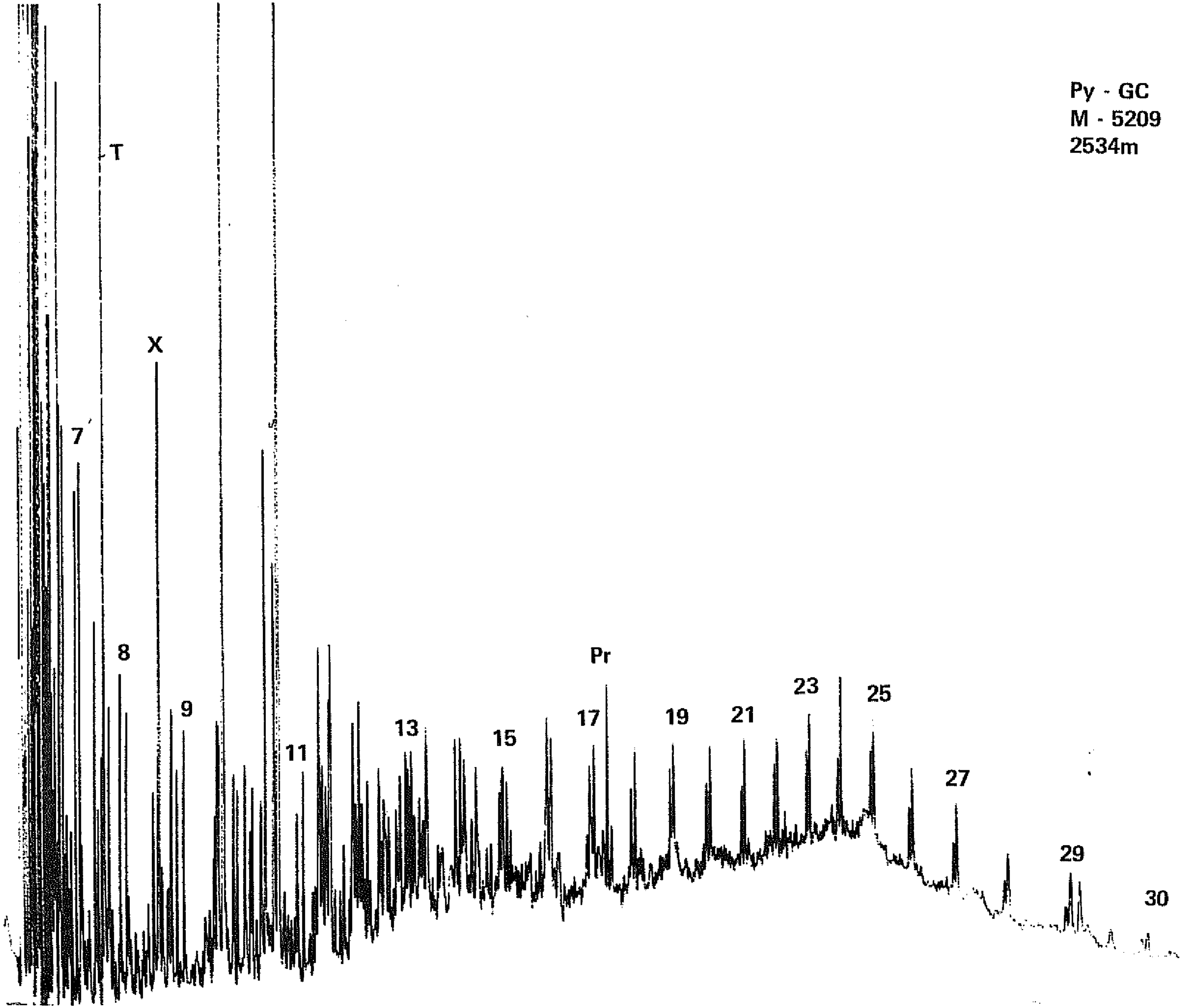


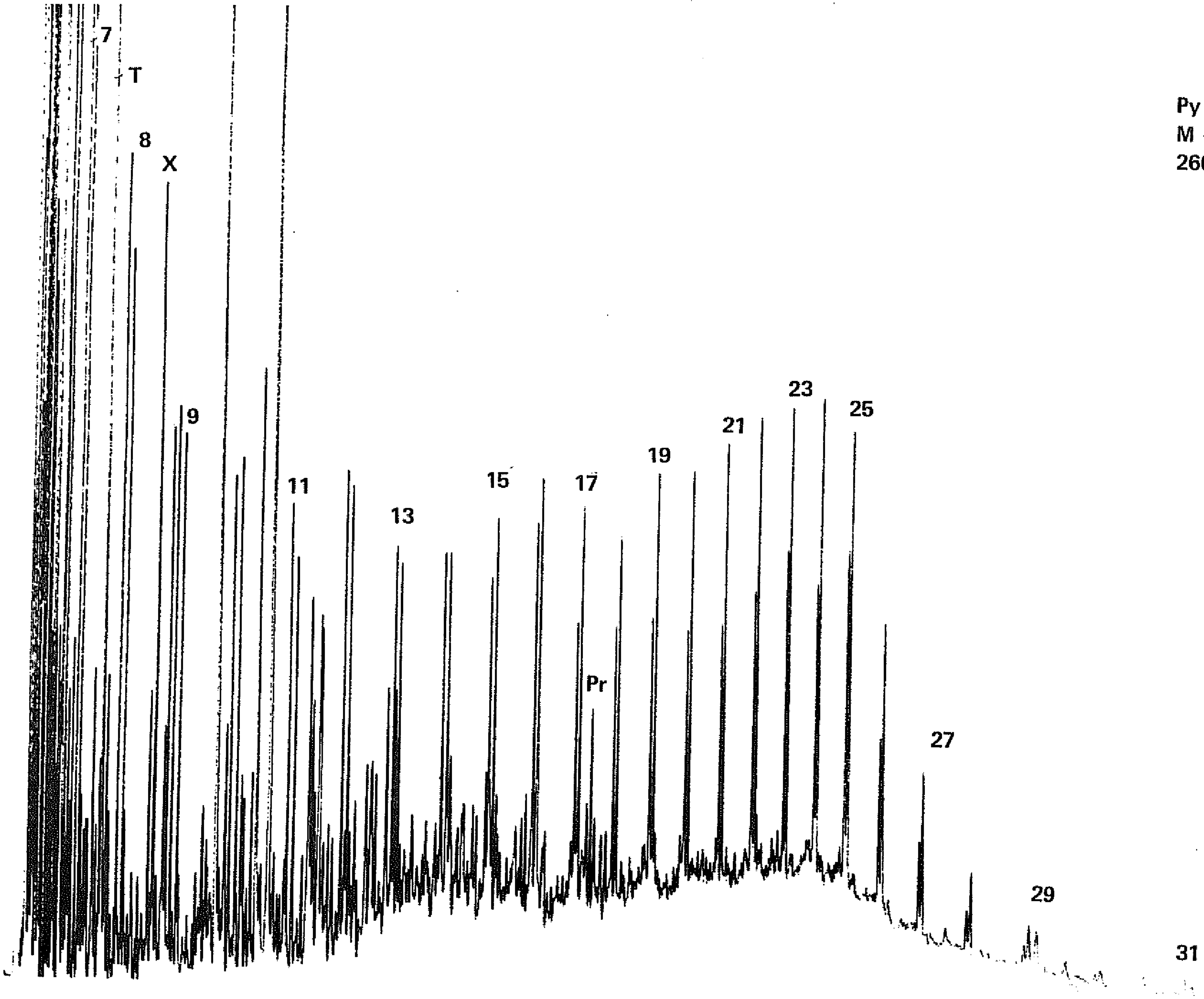
Py - GC
M - 5151
2012m
7
T
X
8
9
11
13
15
17
Pr
19
21
23
25


T
7
8
X
9
11
13
15
17
Pr
19
21
23
25
27
29
30
Py - GC
M - 5203
2480m



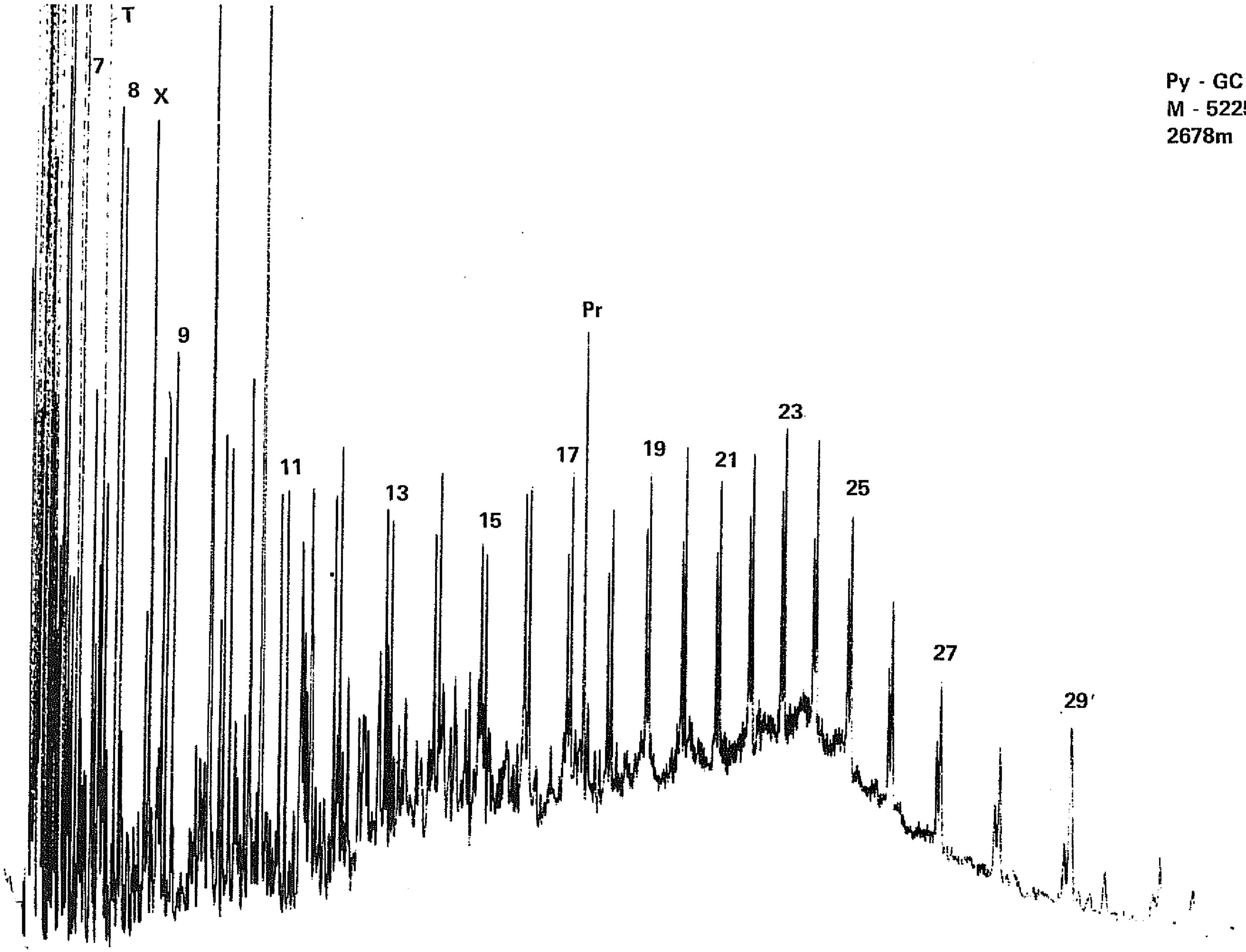
Py - GC
M - 5205
2498m
7
X
T
8
13
15
17
Pr
19
21
23
25
27
29
30

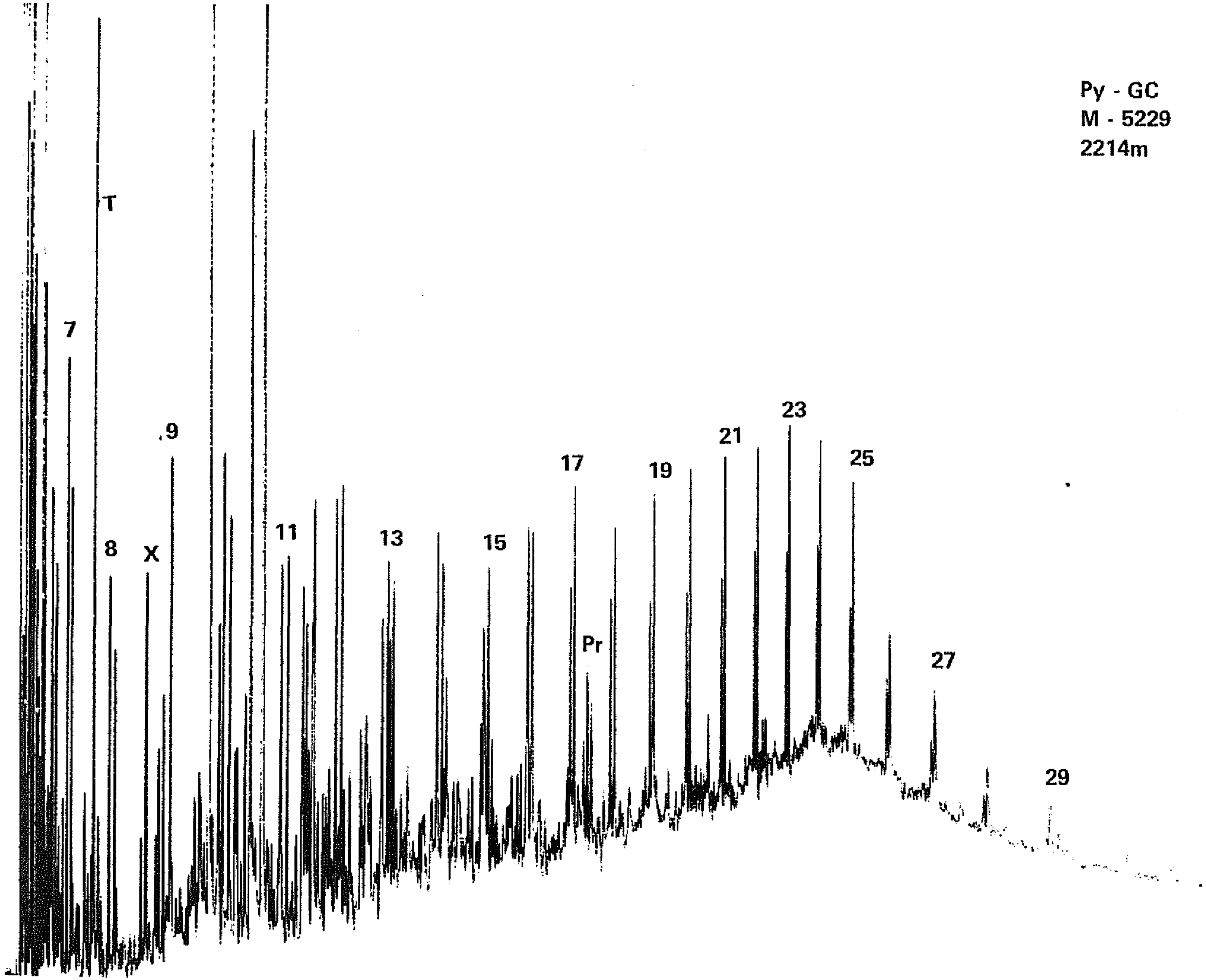

Py - GC
M - 5209
2534m
T
X
7
8
9
11
13
15
Pr
17
19
21
23
25
27
29
30



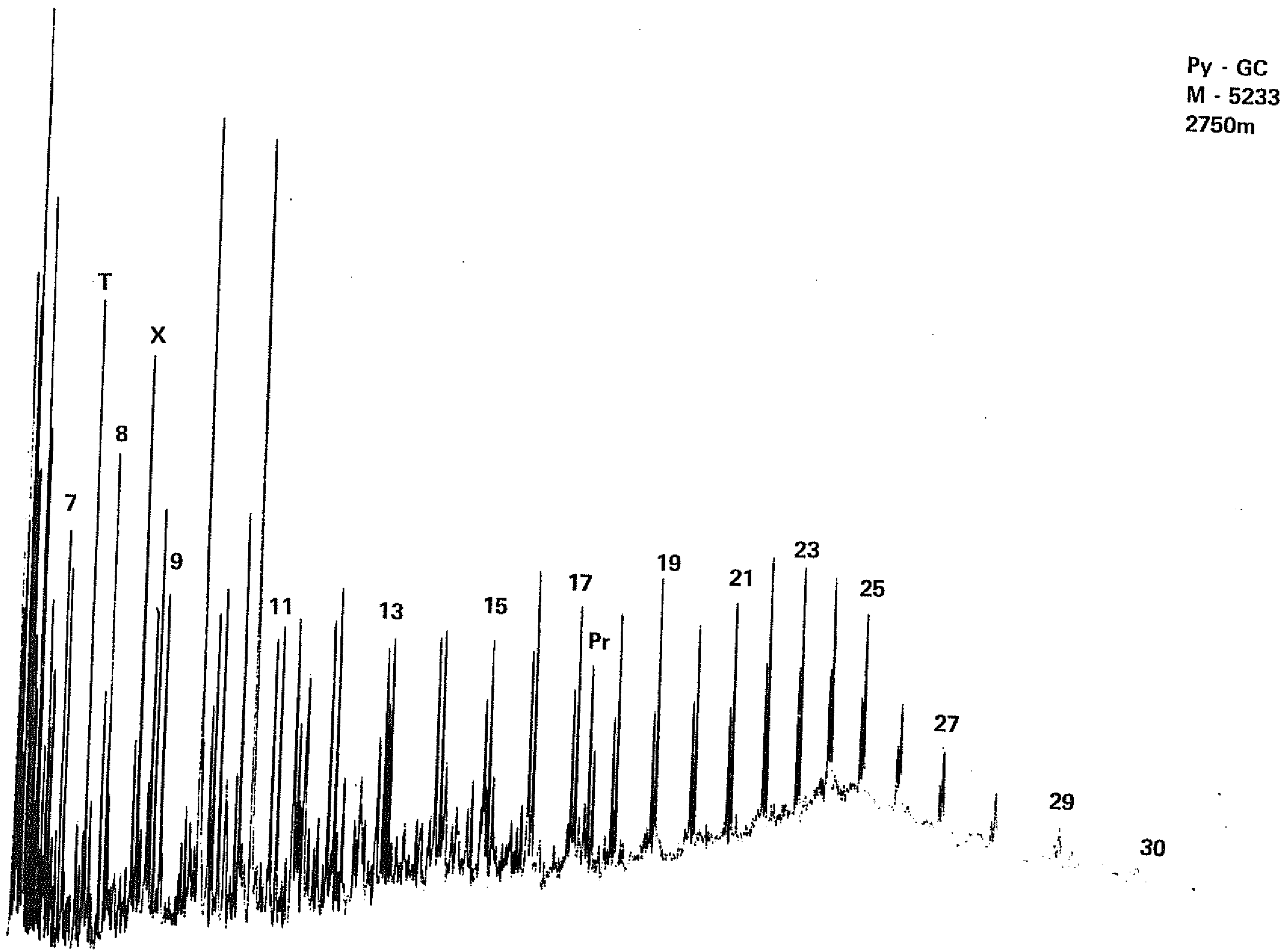
Py - GC
M - 5223
2660m

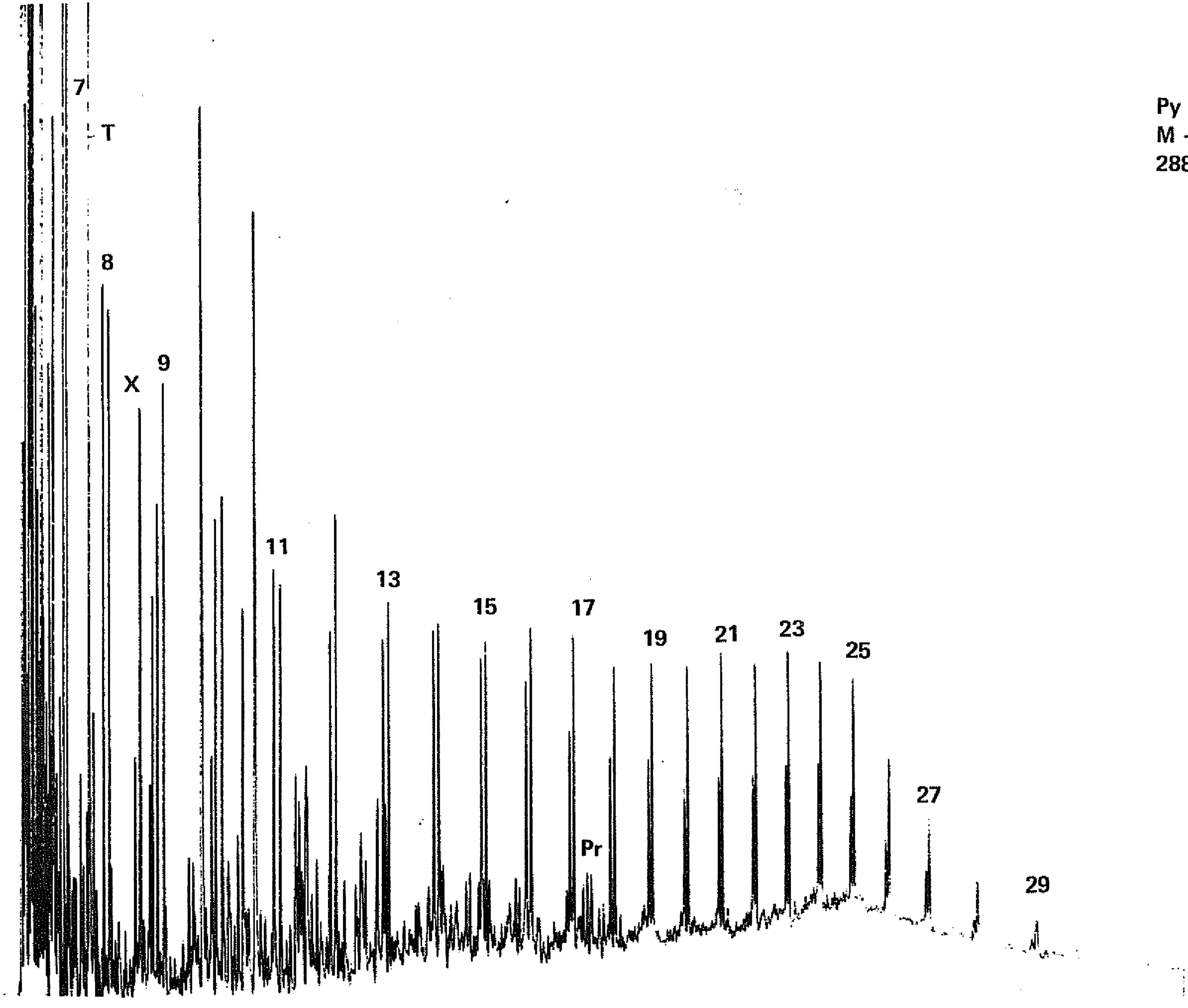
Py - GC
M - 5225
2678m



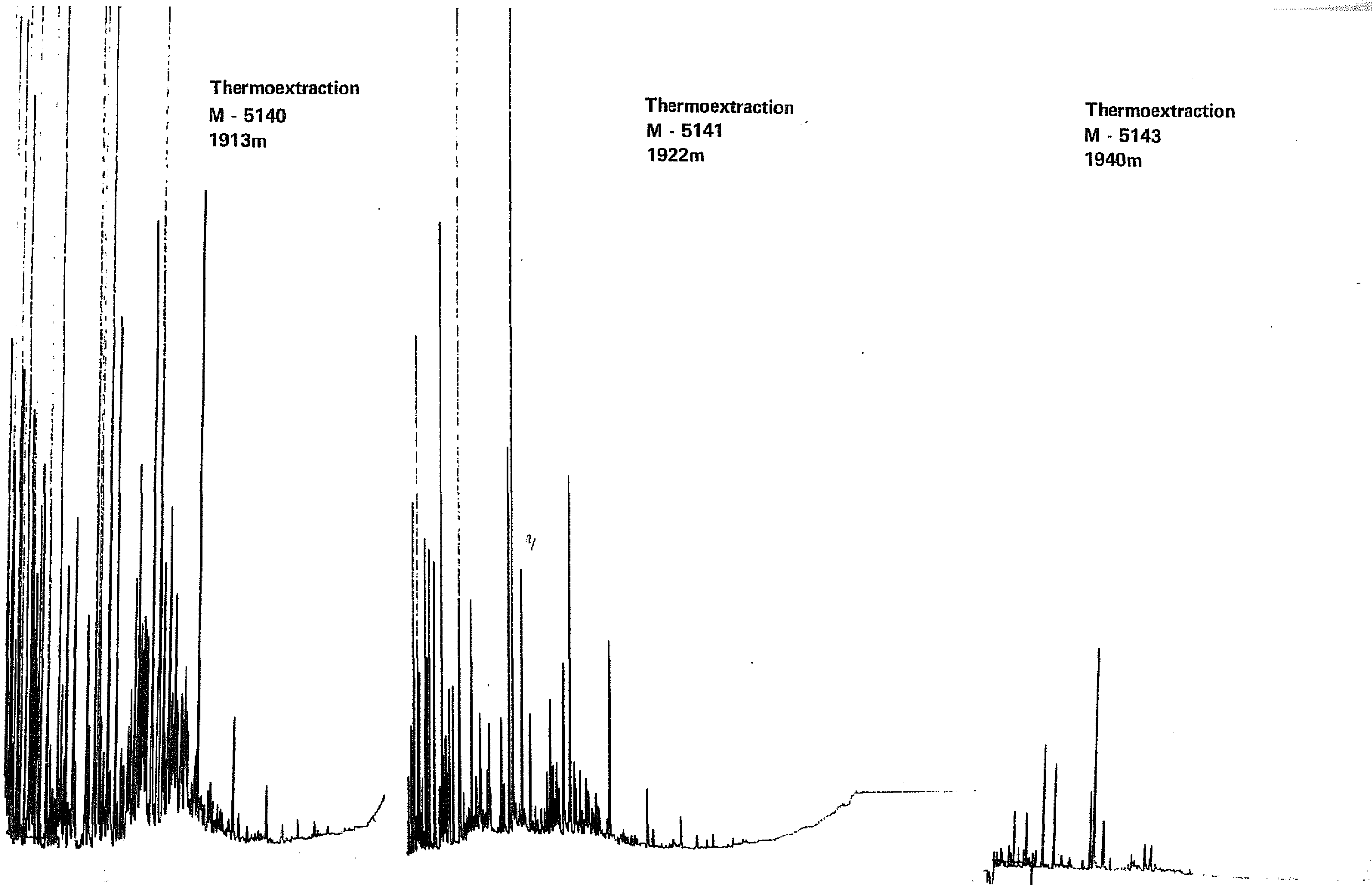


Py - GC
M - 5229
2214m
7
T
8
X
9
11
13
15
17
Pr
19
21
23
25
27
29


Py - GC
M - 5233
2750m
T
X
7
8
9
11
13
15
17
Pr
19
21
23
25
27
29
30



Py - GC
M - 5247
2882m


Thermoextraction
M - 5140
1913m
Thermoextraction
M - 5141
1922m
Thermoextraction
M - 5143
1940m

GC-MS CHROMATOGRAMS

TRITERPANES M/E 191

A = 17 α(H), 21 β(H) - HOMOHOPANE, 22S ($\alpha\beta$-C_{31})
B = " " " , 22R ($\alpha\beta$-C_{31})
C = 17 β(H), 21 β(H) - HOPANE ($\beta\beta$-C_{30})
D = 17 β(H), 21 α(H) - HOMOHOPANE ($\beta\alpha$-C_{31})
E = 17 β(H), 21 β(H) - HOMOHOPANE ($\beta\beta$-C_{31})

STERANES M/E 217

A_1, C_1, E_1 = 5 β(H), 14 α(H), 17 α(H) - 20R and
5 α(H), 14 β(H), 17 β(H) - 20S STERANES
B_1, D_1, F_1, G_1 = 5 α(H), 14 α(H), 17 α(H) - 20R STERANES

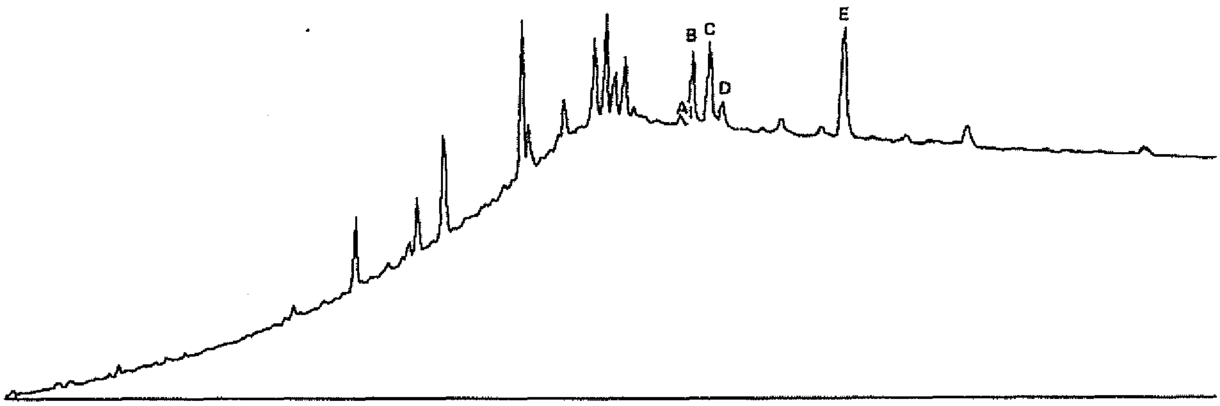
TRIAROMATIC STERANES M/E 231

M = C_{20} TRIAROMATIC STERANE
N = C_{21} " "
O = C_{26} + C_{27} " "
P = C_{28} " "

MONOAROMATIC STERANES M/E 253

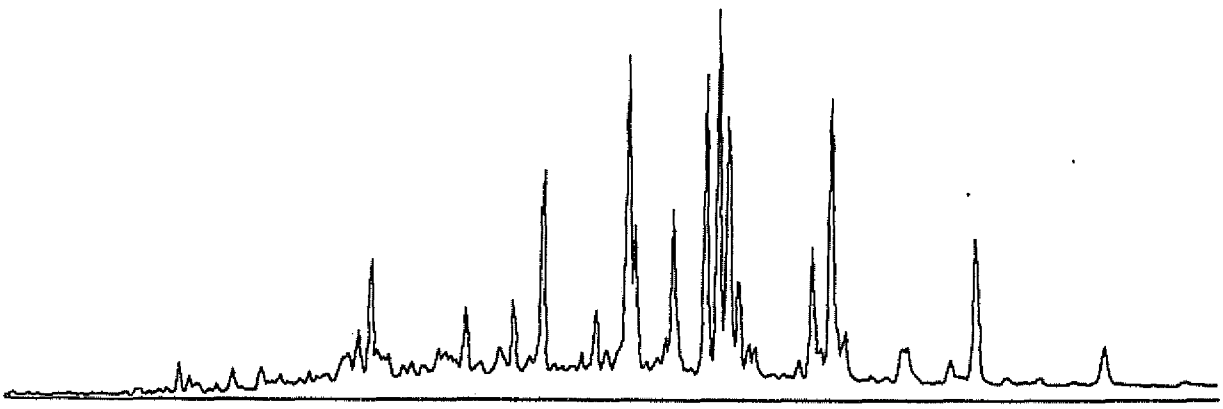
M_1 = C_{21} MONOAROMATIC STERANE
N_1 = C_{22} " "
O_1 = C_{28} + C_{29} " "

[0.0000] M5143S .SD RUN - 1 TRITERPANER STERANER SAGA 6507/11-2
A181S #191S C217S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0:19:35 25.29 245.83



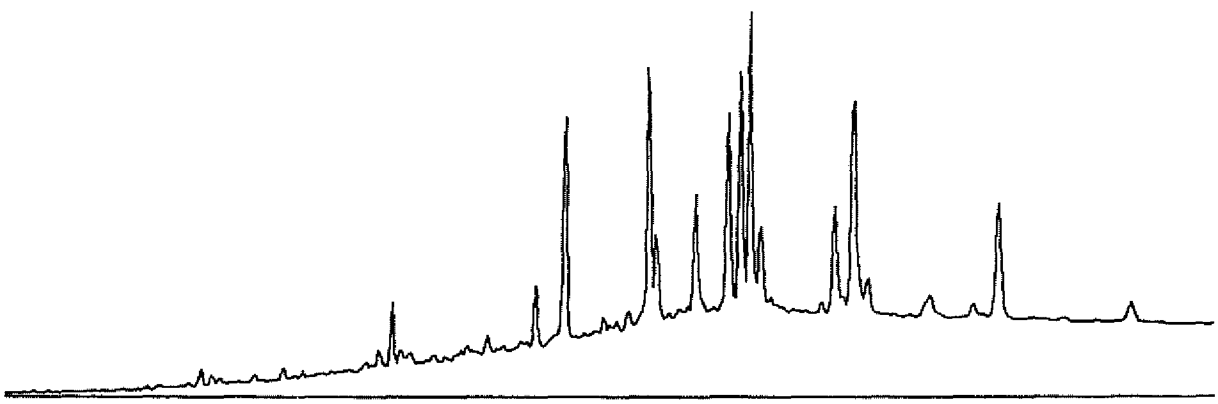
0 HRS 19 MINS 29 SECS 0 HRS 37 MINS 9 SECS

[0.0000] M5215S .SD RUN - 1 TRITERPANER STERANER SAGA 6507/11-2
A181S #191S C217S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0:18:30 49.04 285.67



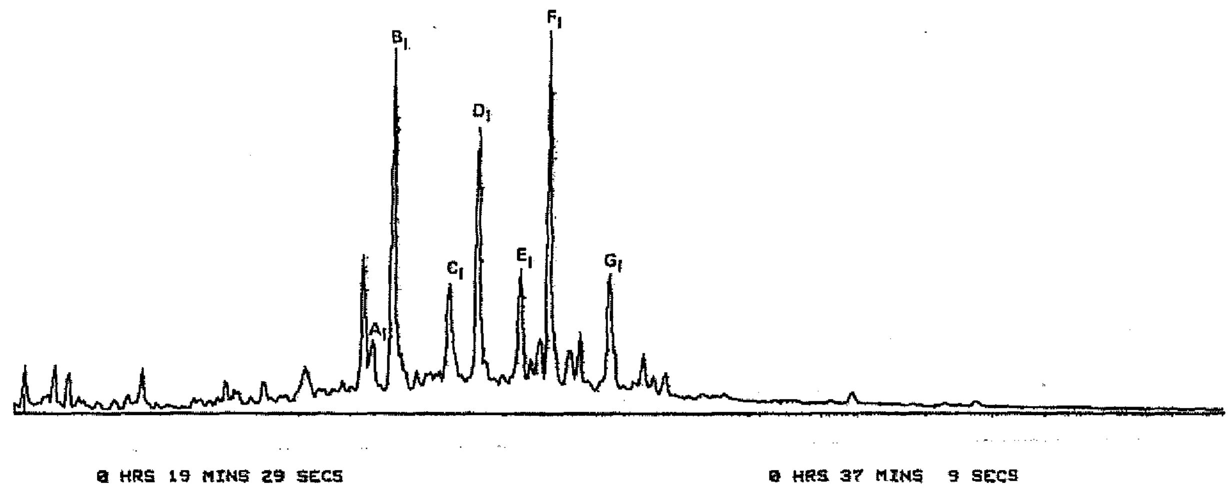
0 HRS 18 MINS 26 SECS 0 HRS 36 MINS 6 SECS

[0.0000] M5203S .SD RUN - 1 TRITERPANER STERANER SAGA 6507/11-2
A181S #191S C217S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0:18: 2 10.77 115.65

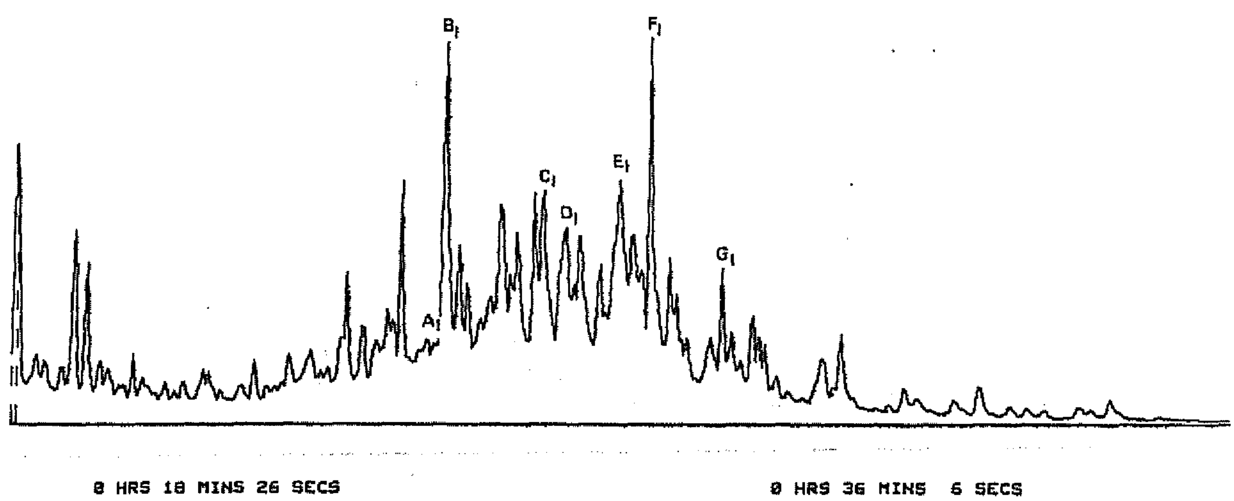


0 HRS 18 MINS 2 SECS 0 HRS 35 MINS 42 SECS

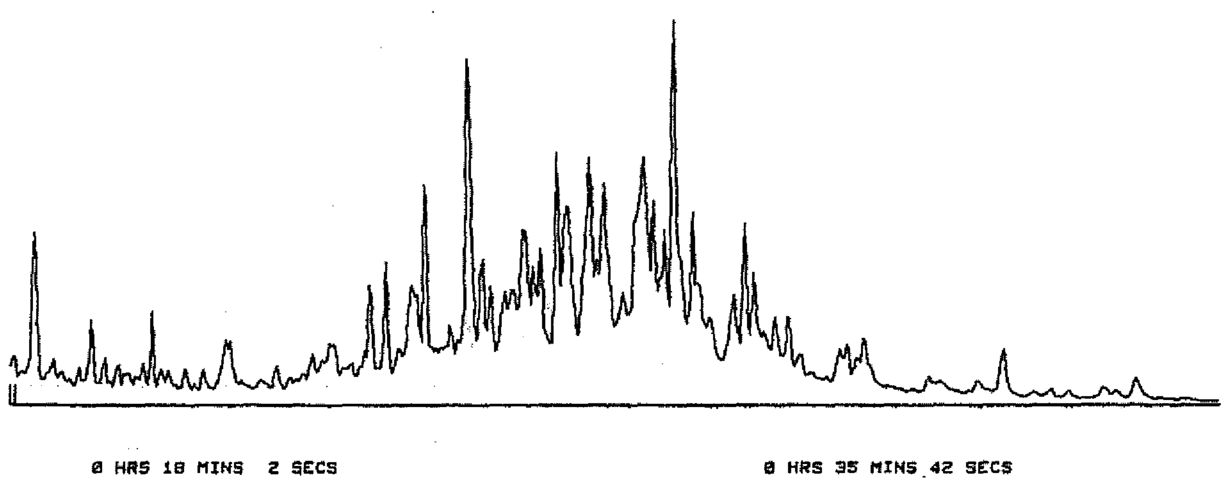
```
C          0.00001   M5143S .SD       RUN -    1  TRITERPANER STERANER SAGA 6507/11-2
  A181S B191S #217S
RETN.TIME      HEIGHT          AREA      UNCALIBRATED.
0:19:37         13.69        118.70
```




```
C          0.00001   M5215S .SD       RUN -    1  TRITERPANER STERANER SAGA 6507/11-2
  A181S B191S #217S
RETN.TIME      HEIGHT          AREA      UNCALIBRATED.
0:18:28        156.36        710.68
```

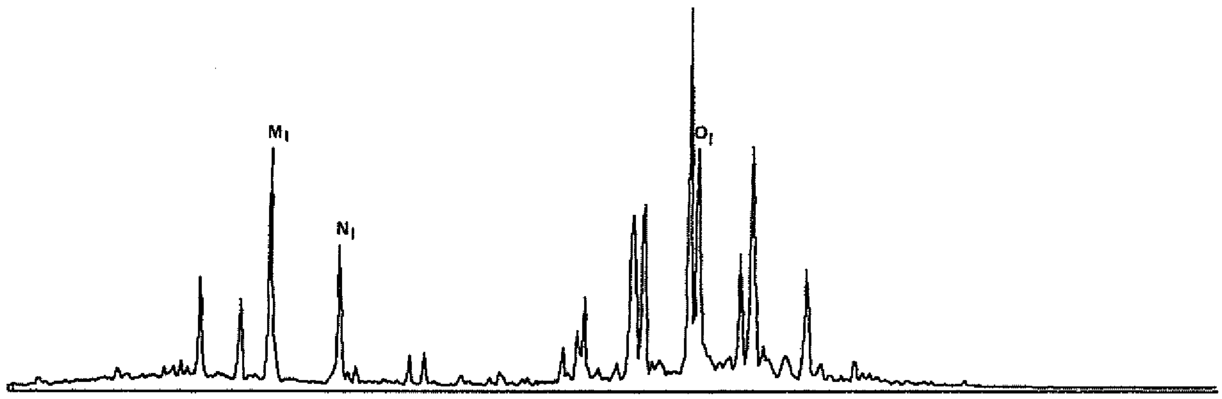



```
C          0.00001   M5203S .SD       RUN -    1  TRITERPANER STERANER SAGA 6507/11-2
  A181S B191S #217S
RETN.TIME      HEIGHT          AREA      UNCALIBRATED.
0:18: 4         13.00         79.23
```



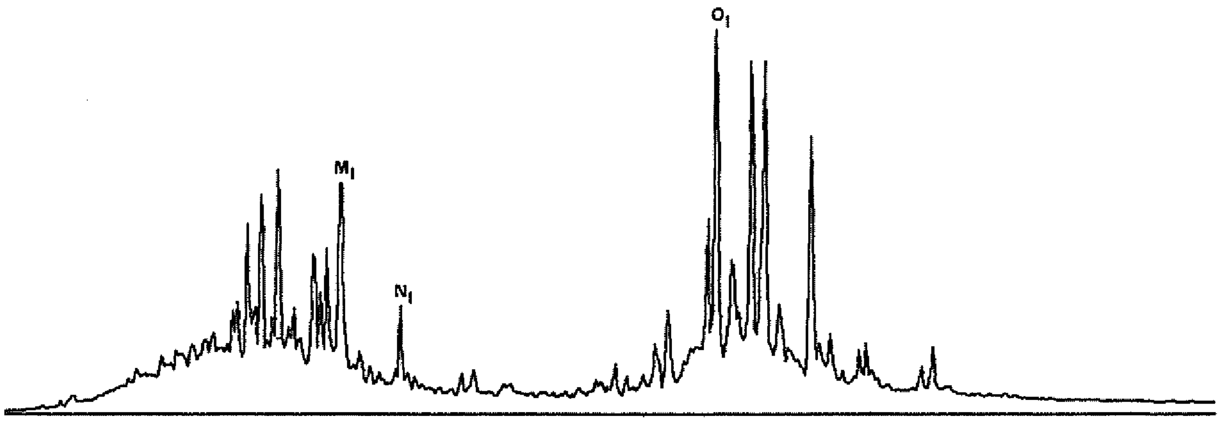
M/E 253

[0.0000] M5143A .SD RUN - 1 AROMATER SAGA 6507/11-2
A181S B231S C239S #253S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0:14:41 11.65 46.75



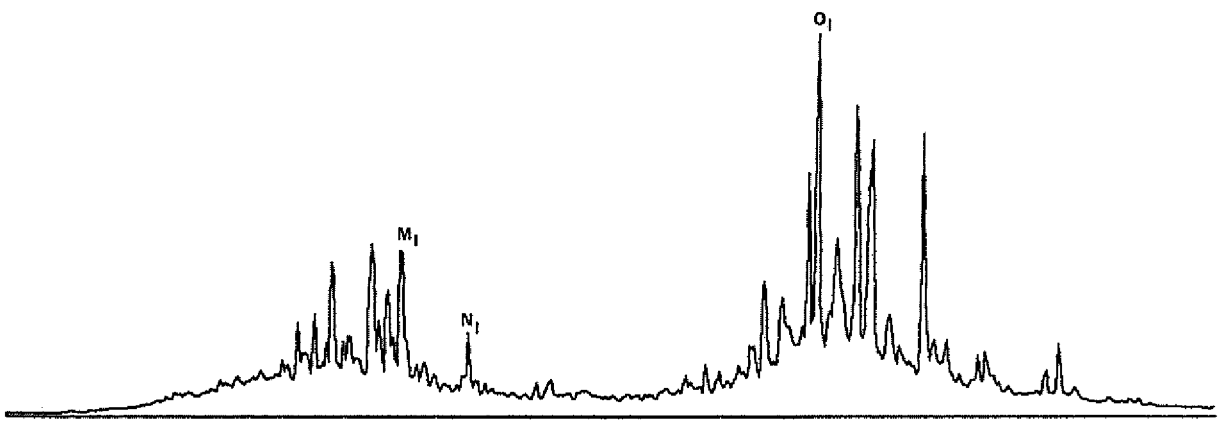
0 HRS 14 MINS 38 SECS 0 HRS 26 MINS 58 SECS

[0.0000] M5203A .SD RUN - 1 AROMATER SAGA 6507/11-2
A181S B231S C239S #253S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0:12:55 7.35 42.45



0 HRS 12 MINS 52 SECS 0 HRS 37 MINS 32 SECS

[0.0000] M5215A .SD RUN - 1 AROMATER SAGA 6507/11-2
A181S B231S C239S #253S
RETN.TIME HEIGHT AREA UNCALIBRATED.
0:11:36 7.26 41.78



0 HRS 11 MINS 33 SECS 0 HRS 36 MINS 13 SECS