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REPORT TITLE/ TITTEL

Source Rock Analysis of Well 6407/2-1

CLIENT/ OPPDRAGSGIVER

Saga Petroleum A/S

RESPONSIBLE SCIENTIST/ PROSJEKTANSVARLIG

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AUTHORS/ FORFATTERE

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SUMMARY/ SAMMENDRAG

On the basis of lithology and analysis of light hydrocarbons seven zones were distinguished.

In general the analysed sequence contains kerogen type III and/or IV with a poor to fair potential for gas generation.

Notable exceptions are a shale in zone E which contains kerogen type II and has a rich potential for oil and gas, and the carbonaceous claystones in zone G which have varied kerogen (II, II/III and III) and have a rich potential as source rocks for gas and paraffinic oil.

The sequence is immature down to approximately 2752m, immature to moderately mature to 3346m and moderately mature to mature below this.

KEY WORDS/ STIKKORD

Source Rock

Haltenbanken

GC-conditions

Column: 25m OV-1, I.D. 0.3 mm, fused silica capillary column.
Carrier gas: Helium with inlet pressure 10 psi. Flow: ca. 1.5 ml/min.
Oven programme: 40°C - 270°C at 4°C/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°C. Seven 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 30m OV-1 fused silica column and the injections were performed in split mode. The temperature of the GC oven was programmed from 150°C to 270°C at 4°C/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

On the basis of results from headspace and occluded gas analyses together with lithological description the analysed sequence can be divided into seven zones:

Zone A: 1000 - 1670m
Zone B: 1670 - 2200m
Zone C: 2200 - 2644m
Zone D: 2644 - 2752m
Zone E: 2752 - 2986m
Zone F: 2986 - 3346m
Zone G: 3346 - 3870m

Light Hydrocarbon Analysis

Zone A: 1000 - 1670m.
This zone consists of a variable mixture of sand and rock fragments together with conspicuous glauconite changing to brown-grey siltstone at the bottom of the zone and small amounts of limestone and claystone. The abundance of C_1 - C_4 hydrocarbons is very variable ranging from poor to good but with a general increase towards the bottom of the zone. The gas is predominantly methane (probably biogenic). There is consequently a very low wetness throughout the zone. The amounts of isobutane and n-butane are below the detection limits (apart from one sample which is presumed to be anomalous) and consequently no iC_4/nC_4 ratio can be determined. The abundance of C_5+ hydrocarbons is also erratic but is poor throughout the zone.

Zone B: 1670 - 2200m.
This zone is dominantly claystone (brownish grey and greenish grey) with medium to dark grey siltstones in varying amounts. The abundance of C_1 - C_4 hydrocarbons decreases slightly at the top of the zone but is very variable throughout, increasing slightly again at the bottom. For most of the zone the gas is dominantly methane with amounts of C_2 - C_4 hydrocarbons too low to record wetness or iC_4/nC_4 ratio. Towards the bottom of the zone there is a slight increase in C_2 - C_4 hydrocarbons thus giving low wetness values. The abundance of C_5+ hydrocarbon is poor throughout the zone.

Zone C: 2200 - 2644m.

This zone begins with varying ratios of grey calcareous/silty claystone, grey siltstone and fine sandstone but changes to a gradation of claystone and siltstone with limestone traces at the bottom. There is a general increase in the abundance of C_1 - C_4 hydrocarbons which remains good throughout the zone. C_2 - C_4 hydrocarbons become more significant within this zone and there is a consequent dramatic increase in wetness and although this is erratic it generally decreases with depth. iC_4/nC_4 ratios are similar to zone B and remain consistent throughout the zone. There is a significant increase in the abundance of C_5+ hydrocarbons in this zone (from poor to good) and it remains high throughout. The increases seen in this zone are probably attributable to gas finding its way from the carbonaceous claystones below (zone E) and having more space to accumulate due to the silty/sandy nature of the claystone in this zone.

Zone D: 2644 - 2752m.

The lithology of this zone is dominantly claystone. However here it can be divided into a grey/greenish-grey/brownish grey unit and a separate reddish-brown unit. There is also a variable amount of light brown to brownish-grey limestone throughout the zone. Although this is a relatively thin zone there is a considerable decrease in the C_1 - C_4 hydrocarbon abundances with depth (from good to poor). Wetness remains low but relatively constant as does the iC_4/nC_4 ratio. The C_5+ abundances decrease to the same degree as the C_1 - C_4 hydrocarbons. This is presumed to be due to the red-brown claystone content.

Zone E: 2752 - 2986m.

The top of this zone continues with the same claystones as in zone D but further subdivisions on the basis of colour become possible. In the middle of this zone, 2851 - 2860m, a dark brown to grey fissile shale appears in minor amounts and then begins to dominate the lithology for approximately 90m before the claystones again assume dominance towards the bottom of the zone. This change in lithology is clearly mirrored in the gas analysis results. There is a increase in C_1 - C_4 hydrocarbon abundances from poor in the claystones at the top to a peak (rich) in the middle (shale) section of the zone and this decreases again to fair in the claystone at the bottom. A similar increase in wetness is observed at the onset of the shale but this

then remains high throughout. The iC_4/nC_4 ratio has a much more moderate variation throughout the zone and remains low. The abundance of C_5^+ hydrocarbons again reflects accurately both the increase in C_1 - C_4 hydrocarbons and the lithology variations, going from poor in the upper claystones, peaking with good abundances in the shale and returning to fair abundances in the lower claystone. This zone may be the source of the gas associated with the siltstone/claystone in zone C but as the claystone in zone D has a low gas abundance this has probably acted as a cap and migration occurred through faults/structures.

Zone F: 2986 - 3346m.

This zone is characterised by an increased but initially variable sandstone content. Claystone and carbonaceous claystone dominate the top of the zone but from 3200m a fine to coarse, white sandstone is the predominant lithology. The abundance of C_1 - C_4 hydrocarbons increases from fair to good throughout the zone but is somewhat erratic. Wetness remain high but trails off slightly at the bottom of the zone. iC_4/nC_4 ratios remain low and constant. The abundance of C_5^+ hydrocarbons fluctuates between fair and good throughout the zone but returns to approximately the same at the bottom as it was at the top.

Zone G: 3346 - 3870m.

This is a thick zone which consists of varying proportions of sandstone, claystone/carbonaceous claystone and coal. The abundance of C_1 - C_4 increases considerably from zone F and remains high (though trails off at the bottom) throughout the zone. The distribution of C_1 - C_4 abundances appears "stepped". Wetness decreases in comparison with zone F but is still moderately high and this is characterised by small scale steps in the values. iC_4/nC_4 ratio increases towards the centre of the zone and exhibits similar, though less marked, changes or steps. C_5^+ abundances decrease from fair at the top of the zone down to 3569m where there is a sudden drop to poor values. This persists until 3785m where values increase again to fair and good. These minor but very noticeable sharp changes correlate quite well from one parameter to another and possibly constitute subdivisions within zone G.

Total Organic Carbon

Where the lithology was suitable (ie. in this case not sandstone or metamorphic/plutonic rock fragments), organic carbon measurements were undertaken on those lithologies constituting 10% or more of the sample.

Zone A: 1000 - 1670m.
Due to lithology only samples from 1530m were analysed. There is a siltstone coming in here but due to similar gas results the section is not divided into a separate zone. The siltstone is light brown and grey and has good to rich abundances of organic carbon throughout.

Zone B: 1670 - 2200m
This zone consists mostly of brownish grey and greenish grey claystone to 1880 metres and in this top section of the zone the claystones have good organic carbon contents. Lighter tone claystones from 1890m to 1920m have fair TOC values. Claystones (partly tuffaceous) between 1930 and 1969m have organic carbon contents of approximately 2%. The brown siltstones developed below 1930m generally have only fair organic carbon values, whereas light green, brown and grey claystones in this section have a poor abundance (generally less than 0.5%).

Zone C: 2200 - 2644m.
This zone consists of grey calcareous/silty claystones, grey siltstone and sandstone. The claystone is sampled most frequently and has fair to good organic carbon contents (average 0.95%). Where analysed the siltstone has similar values to the associated claystone.

Zone D: 2644 - 2752m.
This zone consists of claystones distinguishable on the basis of colour. Total organic carbon values show a general increase with depth from fair to good and this is associated with an increase in the dark grey component of the claystone at the expense of greenish and brownish grey varieties.

Zone E: 2752 - 2986m.
This zone consists of claystones of varying colours and dark, fissile shale. The grey to dark grey claystone has a good organic content

throughout the zone. The shale which occurs in the centre of the zone has rich organic carbon contents (7.15 - 9.65% TOC).

Zone F: 2986 - 3346m.
Grey to dark grey claystones similar to zone E are present along with sandstone. Throughout the zone the claystone has good and rich organic carbon contents but there is no clear trend with depth. Sandstones are dominant between 3211 - 3328 metres.

Zone G: 3346 - 3870m.
This zone consists of claystones (variably carbonaceous) sandstone (not analysed for TOC) and coal. The grey claystones generally have good to rich organic contents throughout the zone but at the bottom the claystone grades to greenish, brownish and yellow and here it has poor organic contents. The more carbonaceous claystone is transitional in places between grey claystone and coal and has generally higher organic contents than the grey claystones but is very variable (3.90 to 44.31%, ie. very rich). As expected, where analysed the coal has still higher values.

Extraction and Chromatographic Separation.

Zone A: 1000 - 1670m.
No samples from this zone were extracted.

Zone B: 1670 - 2200m.
No samples from this zone were extracted.

Zone C: 2200 - 2644.
No samples from this zone were extracted.

Zone D: 2644 - 2752m.
Three samples from this zone were analysed. (M-7414, 2671-2680m; M-7416, 2689-2698m; M-7422, 2743-2752m). All three samples have poor abundances of extractable hydrocarbons both as p.p.m. from the rock and when normalised to organic carbon. There are large differences in the ratio of saturated/aromatic hydrocarbons between the samples possibly indicating different kerogens. The amount of extractable non-hydrocarbons is much higher in the first sample (M-7414) even though the values are low - this can be an indicator of lower maturity. The very high percentage (71% and 94%) of hydrocarbons in the last two samples (which are also marked by high Rock-Eval production indices 0.69 and 0.63) is suggestive of the presence of migrated hydrocarbons. Samples M-7414 and M-7416 both show distinct bimodal n-alkane distributions, and a strong preference for odd numbered n-alkanes, (especially in M-7414). In sample M-7422 this feature is less well developed because the chromatogram is dominated by lower molecular weight n-alkanes. All three samples have high CPI values indicating low maturity, however the low pristane/nC_{17} ratio does not support this. The results can be explained in terms of the input - the samples have a high input of lower molecular weight compounds which will thus dilute the pristane/nC_{17} ratio. It should be noted that Rock-Eval production indices for this zone are very high implying migrated hydrocarbons. The hydrogen and oxygen indices would also imply type IV kerogen (inertinite, reworked material) so here we are probably seeing a masking of the true kerogen composition by migrated hydrocarbons and the higher molecular weight end is probably more representative.

Zone E: 2752 - 2986m.

Eight samples were extracted from this zone. On the basis of extractabilities the zone can be divided into two sections. Samples M-7426 (2779-2788m), M-7430 (2815-2824m) and M-7432 (2833-2842m) constitute the first group. In these three samples extractabilities are poor both as p.p.m. of the rock and when normalised to organic carbon (as for zone D). Sample M-7426 is very similar to M-7422 of zone D. The other two samples have a more complicated picture at the higher molecular weight end of the chromatogram. Here, more geochemical fossils can be seen implying low maturity CPI values also indicate low maturity. In sample M-7430 as with certain samples above, the pristane/nC_{17} ratio does not agree with a low maturity evaluation. The same reason as for zone D is probably accountable. The high percentage of hydrocarbons in the lower two samples (91 and 93%) suggests migrated hydrocarbons. Sample M-7432 does have a high pristane/nC_{17} ratio indicating low maturity but the pristane/phytane ratio appears to be the result of oxidising conditions and terrestrial input. Sample M-7430 has a much higher saturated/aromatic hydrocarbon ratio than the other samples. Again Rock-Eval production indices imply that migrated hydrocarbons are present and these must be responsible for the lower molecular weight distribution in the gas chromatograms of the top group within this zone. Hydrogen and oxygen indices indicate type IV kerogen which would be more in agreement with the predominance of higher molecular weight material in the saturated hydrocarbon distribution and also with the calculated parameters (Pristane/Phytane ratios).

The second group - samples M-7434 (2851-2860m), M-7436 (2869-2874m), M-7438 (2887-2896m), M-7440 (2905-2914m) and M-7442 (2923-2932m) all have rich abundances of extractable hydrocarbons which are good when normalised to organic carbon. All of the samples have front biased n-alkane distributions with high contents of low molecular weight compounds. In the case of these samples the Rock-Eval production indices show no indication of migrated hydrocarbons and the hydrogen and oxygen indices imply type II kerogens. In the gas chromatograms of this group we are probably seeing a clear picture of a change in kerogen type to marine dominated input along with the associated lithological change from claystone to rich shales. There is a higher content of aromatics than of saturates and of extractable non-hydrocarbons than of hydrocarbons. The higher molecular weight end has a considerable input of geochemical fossils and the general picture is one of samples dominated by a marine input. High pristane/nC_{17} and low

pristane/phytane ratios indicate immature samples. Values for pristane/-phytane of less than 1 indicate that sediments were deposited in a highly anoxic environment.

Zone F: 2986 - 3346m.

Three samples from this zone were extracted (M-7661: 3085-3094m, M-7665: 3121-3130m and M-7669: 3157m3166m). Sample M-7661 has a rich abundance of extractable hydrocarbons which is good when normalised to organic carbon (in this respect it is similar to samples from zone E) whereas the two lower samples have only a fair extractability (both as p.p.m. of rock and when normalised to organic carbon). The samples have front-end biased n-alkane distributions (although there is a large unresolved envelope in the higher molecular weight end of sample M-7661), with maxima at nC_{15} in M-7661 and M-7665 and nC_{17} in M-7669. Sample M-7669 (3157-3166m) shows more of the higher molecular weight compounds indicative of a large terrestrial input. Pristane/nC_{17} ratio and CPI are indicative of immature to moderately mature samples. There is evidence of possible migrated hydrocarbons from Rock-Eval production indices - this being responsible for the lower molecular weight distribution. The percentage of total hydrocarbons is quite high for what is a moderately mature to mature zone (40 and 61%) and probably represent migrated hydrocarbons, or in the case of M-7661, contaminant in the sample.

Zone G: 3346 - 3870m.

Four samples from this zone were extracted (M-7694: 3382-3391m; M-7704: 3472-3481m; M-7716: 3578-3587m and M-7728: 3686-3695m). Samples M-7694 and M-7704 have a rich abundance of extractable hydrocarbons but when these results are normalised to organic carbon, the values are poor. This is possibly due to the low maturity of the samples. Both samples have far higher extractabilities of non-hydrocarbons than of hydrocarbons which is also a indication of immaturity. Sample M-7716 has a rich abundance of extractable hydrocarbons which is only fair when normalised to organic carbon (again due to immaturity). Sample M-7728 has only fair extractabilities both in p.p.m. of the rock and when normalised to organic carbon. This sample also has a much higher extractability of non-hydrocarbons than of hydrocarbons. The gas chromatograms of all of the samples are similar. There is a very high content of pristane and there is a greater abundance of high molecular weight n-alkanes with maxima at nC_{25} or nC_{27}. There is

a high CPI. Because of the high pristane content the pristane/nC_{17} ratio appears very high indicating low maturity but this could be misleading if the pristane content is high as a consequence of terrestrial input. Pristane/phytane ratios are extremely high and are indicative of a high terrestrial contribution and/or oxidising conditions. The distributions are typical for mixed type II/III kerogens of low maturity.

Many of the saturated hydrocarbon gas chromatograms are characterised by a high peak accompanying the C_{27} n-alkane. This is believed to be a phthalate contaminant and is marked Ph on the chromatograms. It is possibly introduced along with some component used intermittently in the drilling mud as it is not believed to be a laboratory contaminant.

Aromatic Hydrocarbons

Aromatic hydrocarbon gas chromatograms were obtained for seven samples from the analysed section of the well.

The seven samples make two distinct groups. Three samples from 2869 - 2878m, 2887 - 2896m and 2905 - 2914m (M-7436, M-7438 and M-7440) constitute one group. The samples from 3382 - 3391m, 3472 - 3481m, 3578 - 3587m and 3686 - 3695m (M-7694, M-7704, M-7716 and M-7728) make up the second group.

The first three samples which have very similar gas chromatographic patterns show the following characteristics:

a) There are a number of peaks in region F which probably include aromatised steranes and triterpane compounds.
b) Organic sulphur compounds (marked with an asterisk - *) have been tentatively identified.
c) C_1 - naphthalenes are the dominant peaks in the gas chromatograms.

Generally the second group of samples are very similar to each other. However, unlike the first group there are few peaks in region F and organic sulphur compounds are less prominent. C_1 - naphthalenes are still the dominant compounds. However phenanthrene (P) and the C_1 phenanthrenes (D) are more prominent particularly in the first two samples of the lower group.

An additional difference between the two groups is that the peaks in the region in which the C_2 and C_3 - naphthalenes elute (B and C) have slightly different distributions in the two groups.

The aromatic hydrocarbons of the first group of samples is characteristic for moderately mature marine type II kerogens (marked by an abundance of aromatised steranes/triterpanes and of organic sulphur compounds, whereas phenanthrene and the alkyl phenanthrenes are relatively minor constituents). The second group is characteristic more of moderately mature - mature type III kerogens.

GC analyses of branched/cyclic saturated hydrocarbons after urea-adduction.

Seven samples from two different depth intervals were treated by urea adduction and the branched/cyclic fraction was analysed by gas chromatography.

Some samples, M-7438 in particular, still contain traces of n-alkanes after the urea adduction step. Due to low sample amounts the process was not repeated. Even with some n-alkanes left in some of the chromatograms, the samples can easily be divided into two different groups. The 3 shallowest samples (2878 - 2914m) contain nearly the same amount of pristane and phytane (Pr/Ph = 0.8-1.0), and also a certain amount of the lower molecular weight isoprenoids (C_{15}, C_{16}, C_{18}). The sterane/-triterpane part of the chromatograms is dominated by one peak, except for M-7438 where a prominent peak representing an unidentified component, is seen. GC-MS analysis of one of these samples revealed that the peak marked C_{27} in the chromatograms is a C_{27} triterpane. The mass spectrum of this component does not have a prominent m/e 191 ion, and will thus not be seen as the dominating component in the m/e 191 traces. This component has previously been found in immature samples.

The 4 deepest samples appear different from the shallower ones, in that the Pr/Ph ratio is increased (4.7-9.2) and the sterane/triterpane region looks more like a typical triterpane (m/e 191) trace. This is discussed in the GC-MS section.

The deepest sample in zone G (M-7228) has a chromatogram which differs from the others in this zone. The picture is somewhat intermediate between those of zone E and the others in zone G. The same sample has a higher content of phytane than of the C_{16} and C_{17} isoprenoids whereas in the other samples in zone G the situation is reversed.

Transmitted Light Analysis of Sedimentary Organic Matter

The analysis of 6407/2-1 was based on a selected batch of 28 shale and claystone samples, from ditch cuttings.

The organic material in the acid insoluble residues is dominantly from terrestrial sources. The residues are pyritic. The entire well is immature, (1-, 1/1+ and 1+/2- increasing to 2- below 3472m).

Interval 1530 - 1620m:
Two residues composed of dense granulate aggregates, with an amorphous matrix, embedding small sized, sapropelised vitrinite particles and palynomorphs. The exact amount of true amorphous material was difficult to estimate, but it is probably the dominant component in the upper sample.

Interval 1730 - 2400m:
Four well-dispersed residues with dominantly woody material and reworked/oxidised woody material (semifusinite/fusinite). Rich and well preserved dinoflagellate cyst assemblages. True amorphous material is present in smaller amounts (20 - 30% of the residue).

Interval 2470 - 2680m:
Woody material and reworked/oxidised woody material dominate completely. The oxidised woody material has increased compared with the above samples. The relative amount of pollen and spores in relation to cysts, is reduced. True amorphous material accounts for about 20% of the residues.

Interval 2689 - 2716m:
Composition, mainly woody and reworked woody material (as for interval 2470 - 2680m). Coal fragments are present in the residues. The composition and preservation of the cyst assemblage is different from the samples above. Amorphous material accounts for about 20% of the residues.

Interval 2743 - 2824m:
The residues (which are smaller than in the above interval), consist of a major part of reworked woody material and indigenous woody material. Vitrinite fragments may show a dull colour and etched surfaces. The cysts are well preserved as above. Amorphous material seems subordinate.

Sample 2833 - 2842m:
Dense pyritic aggregates embedding small vitrinite particles. Occasional grey vitrinite particles and some semifusinite. Well preserved dinoflagellate cysts. Subordinate true sapropel.

Sample 2851 - 2860:
Small rounded aggregates and generally poorer preservation. Tasmanitids are fairly common, Botryococcus is present. True sapropel was evaluated as about 30% of the residue and is of greater significance than in the samples above.

Interval 2869 - 2914m:
Fairly dense, pyritic, aggregates where amorphous material embeds mostly sapropelised structured material (cuticles). Tasmanitids and Botryococcus were frequent. It is difficult to distinguish confidently between algae and degraded cuticles. The preservation is mostly poor.

Sample 2923 - 2930m:
The sapropelised former structured material in this sample was evaluated as representing a major algal input (Botryococcus) beside common cuticles. As above, the distinction between the two categories is difficult.

Interval 3085 - 3130m:
The residues contain a larger proportion of well dispersed particles and woody material is more abundant than in the sample above (2923 - 2930m). Structured woody material is common. Of note is the presence of Botryococcus and small fungal/algal bodies. Amorphous material seems subordinate, but sticks to cyst surfaces. The colours seem brighter at this level.

Sample 3157 - 3166m:
This residue is rich in sapropelised cuticles but otherwise seems to resemble 3085 - 3130m above.

Sample 3382 - 3391m (Carb.):
The sample contains mainly woody material partly as coaly fragments that are too dense for closer classification. Palynomorphs are fairly well preserved and generally represent long-ranging Mesozoic forms.

Sample 3472 - 3481m:
Coaly fragments, mainly woody material, and some spores as in sample 3382 - 3391m above.

Sample 3578 - 3587m:
More strongly sapropelised material, dominantly cuticles. The palynomorphs are well preserved and of Early Jurassic nature.

Sample 3686 - 3695m:
Sapropelised woody material and cuticles dominate. Fairly well preserved palynomorphs include common Limbosporites lundbladii together with the forms also seen above this level.

Examination in Reflected Light.

Fifteen samples were selected to give an approximately even coverage of the drilled sequence. These samples are described in detail below:

Sample M-7298; 1530 - 1540m: Siltstone, sandstone and limestone, Ro = 0.30 (18)
The sandstone and limestone were almost barren. The siltstone has a moderate organic content and the result is based on this lithology. There are some good vitrinite wisps with bituminite and occasional inertinite particles. No fluorescence is observed.

Sample M-7314, 1690 - 1700m: Claystone and sandstone, Ro 0.31 (23)
The sample has a moderate to high organic content. This is dominantly vitrinite with bitumen blobs and staining. There is a trace of inertinite and reworked vitrinite. Fluorescence is seen from a trace of green spores.

Sample M-7328, 1830 - 1840m: Claystone, Ro = 0.31 (5)
There is a very low organic content which is very patchily distributed. It is dominantly bitumen blobs and staining with a low vitrinite content and still lower inertinite content. There is a trace of spores which fluoresce green.

Sample M-7340, 1950 - 1969m: Claystone and sandstone, Ro = 0.33 (14)
The sample has a low to moderate organic content which is dominated by bitumen staining and blobs. There is only an occasional gnarled vitrinite particle and a trace of inertinite. Cleaner particles give values slightly above the average. There is a trace of possible spores fluorescing green.

Sample M-7374, 2290 - 2300m: Claystone, siltstone and lignite, Ro = 0.45 (5)
Apart from the lignite (Ro = 0.35) there is only a moderate organic content and this is dominantly inertinite and reworked vitrinite. It is a poor sample and the result may be high (especially if the lignite is in situ). There is a trace of green/yellow spores.

Sample M-7384, 2390 - 2400m: Claystone, No Determination Possible
The sample appears to contain only reworked vitrinite and inertinite but in ultra-violet light a trace of green/yellow fragments (spores? algae?) is observed.

Sample M-7400, 2545 - 2554m: Claystone, shale and sandstone, Ro = 0.49 (6)
There is a low organic content and this is almost completely inertinite and subordinate reworked vitrinite. There is a poor vitrinite content and some lignite (Ro = 0.30) but it is not clear if this is additive. The result may be high. There is green yellow fluorescence probably from the lignite.

Sample M-7420, 2725 - 2734m: Claystone, Ro = 0.33 (1)
The sample contains almost totally reworked vitrinite together with inertinite. The result, based on only one possible vitrinite fragment should be treated cautiously. There is fluorescence from algae (green) but this is probably from the minor (contaminant?) coal fraction.

Sample M-7436, 2869 - 2878m: Shale, Ro = 0.30 (16) and 0.50 (4)
The sample has a high organic content which consists dominantly of bitumen, bitumen staining and vitrinite with only a low inertinite content. The bitumen staining is very heavy in places. There is fluorescence from green/yellow spores and algae and a trace of yellow/-orange spores.

Sample M-7653, 3013 - 3022m: Claystone, sandstone and shale, Ro 0.28 (1) and 0.42 (3)
This is a poor sample. The claystone is rich in inertinite but contains very little vitrinite. The shale is rich but is assumed to be caved. There is only a trace of green/yellow fluorescence from algae.

Sample M-7669, 3157 - 3166m: Claystone, sandstone and lignite, Ro = 0.32 (2) and 0.55 (3)
This is another poor sample. The claystone contains almost completely inertinite and reworked vitrinite whilst the lignite is probably additive. Green and green/yellow spore fluorescence agrees with the lower Ro value.

Sample M-7689, 3337 - 3346m: Claystone and limestone, Ro = 0.46 (6)
There is a moderate organic content which is dominantly inertinite and reworked vitrinite. There is a moderate bituminite content. There is a (reworked?) population about Ro = 0.75. Green/yellow and yellow fluorescence is seen from a low spore content.

Sample M-7710, 3526 - 3535m: Claystone and coal, Ro = 0.54 (27)
The claystone is rich, especially in vitrinite and bitumen. The coal is very variable but there is sufficient to assume that it is in situ. The result seems to be high, however, yellow/orange fluorescence from spores supports a slight increase in maturity.

Sample M-7728, 3686 - 3695m: Claystone, sandstone and coal, Ro = 0.60 (27)
The claystone is very rich, there are some good vitrinite bands. Bitumen staining is locally very heavy. The coal gives the higher values although the two lithologies overlap. There is fluorescence from low orange spores and algae probably from the coal.

Sample M-7744, 3829 - 3838m: Claystones, Ro = 0.51 (20) and 0.77 (3)
The sample is very variable but is mostly dominated by inertinite and some loose coal fragments of higher Ro which could be contamination (additive?) There is some bitumen and bitumen staining. There is fluorescence from spores within the coal (yellow/orange and low orange).

Rock-Eval Pyrolyses

Zone A: 1000 - 1670m.
Four samples from this zone were pyrolysed on a Rock-Eval instrument. All of the analysed samples have low T_{max} values indicating immaturity. The samples have low hydrogen and oxygen indices typical for type III/IV kerogens. Production indices are moderate to high indicating the possibility of migrated hydrocarbons. The potential (S_1 + S_2) is fair but due to the type of kerogen this will be only for gas.

Zone B: 1670 - 2200m.
Five samples from this zone were analysed. T_{max} values are all low indicating immature samples. Hydrogen and oxygen indices are representative of type IV kerogens (especially M-7326 and M-7330). Production indices are even higher than in zone A and indicate the presence of migrated hydrocarbons. Apart from the top sample (M-7341) for which the potential - and the production index - is more like those of zone A, the zone has a poor petroleum potential. Due to the kerogen type this would be only for gas.

Zone C: 2200 - 2644m.
Eleven samples were selected from this zone for Rock-Eval pyrolysis. In general there is an increase in T_{max} indicating some increase in maturity however the values are still within the immature zone. Production indices remain high throughout the zone and indicate the presence of migrated hydrocarbons. Hydrogen and oxygen indices are similar to the zones above and indicate type IV kerogens. The zone has a poor potential for gas.

Zone D: 2644 - 2752m.
Six samples were analysed from this zone. In general the hydrogen and oxygen indices imply the presence of type IV kerogen. T_{max} values seem very high but are quite erratic and probably misleading. Production indices are very high indicating the presence of migrated hydrocarbons. The zone has only a poor potential for gas.

Zone E: 2752 - 2986m.
Fourteen samples from this zone were pyrolysed on a Rock-Eval instrument. There is a general decrease in T_{max} values implying that these from zone D were too high. The first five samples (down to 2842m depth)

have extremely high production indices indicating migrated hydrocarbons are present and they have a kerogen similar to the zone above. Samples M-7426 and M-7428 have very low anomalous T_{max} values probably due to measurements on bitumen rather than kerogen. Below 2851m (where the organic-rich shale comes in) there is a drastic change in the data. T_{max} values once again are low (indicating immature samples) as are the production indices. Hydrogen and oxygen indices indicate the kerogen to be type II (possibly with some type I?) The bottom section of the zone has a rich potential as a source for oil.

Zone F: 2986 - 3346m.
Six samples from this zone were analysed. Apart from one sample (M-7661: 3094m) there is a return to low hydrogen and oxygen indices probably indicating a kerogen type IV input for the rest of the samples. T_{max} values indicate immature samples. The production indices vary and overall are intermediate between zone E and previous zones. There is less if any indication of possible migrated hydrocarbons. Apart from sample M-7661 and M-7669 which have good and fair potentials ($S_1 + S_2$) respectively, the zone in general has a poor potential which due to the kerogen type would be mainly for gas.

Zone G: 3346 - 3870m.
Four samples from this zone were analysed. These were all carbonaceous claystones of very high TOC. T_{max} values for this zone indicate moderately mature to mature kerogens are present but the production indices are very low which implies an absence of migrated hydrocarbons. From the hydrogen an oxygen indices the samples contain type II (M-7694) type III (M-7728) and mixed type II/III (M-7704 and M-7716) kerogens. The petroleum potential for all of the samples is high and the carbonaceous claystone within the zone would be a good (rich) source based on $S_1 + S_2$ richness.

Pyrolysis Gas Chromatography (Py-GC)

28 thermoextracted whole rock samples were analysed by Py-GC. The instrumental conditions are described in the experimental section. The results are discussed below. Based on retention times and mass spectrometric 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. B = benzene; X =m p-xylenes and Pr = pristenes.

M-7298 (1540m), M-7306 (1620m) and M-7318 (1740m).
The pyrograms of these three samples are overall very similar showing an n-alkene/n-alkane homology ranging from C_7 to ca C_{20} and the abundance of aromatics is high relative to the aliphatics. Generally the pyrograms show a type III kerogen fingerprint.

M-7368 (2240m), M-7376 (2320m), M-7384 (2400m), M-7392 (2480m) and M-7400 (2554m).
The pyrograms of these five samples are overall very similar showing an n-alkene/n-alkane homology ranging from C_7 to ca. C_{20}. The abundance of aromatics is lower than in the three previous samples but the short range of the aliphatic homology indicates a low input of lipid material. The kerogens may be classified as mixed type III/II.

M-7408 (2626m), M-7414 (2680m), M-7416 (2698m) and M-7418 (2716m).
The pyrograms of these four samples are overall very similar showing an aliphatic homology ranging from C_7 to ca. C_{17}. Generally the pyrograms show a type III kerogen fingerprint.

M-7422 (2752m), M-7426 (2788m), M-7430 (2824m) and M-7432 (2842m).
The pyrograms of these four samples are overall very similar showing a high abundance of aromatics, i.e. a type III kerogen fingerprint.

M-7434 (2860m), M-7436 (2878m), M-7438 (2896m), M-7440 (2914m) and M-7442 (2932m).
The pyrograms of these five samples are almost identical showing an n-alkene/n-alkane homology ranging from C_7 to ca. C_{23} with a moderate content of aromatics, i.e. a type II kerogen fingerprint.

M-7661 (3094m), M-7665 (3130m) and M-7669 (3166m).

The pyrograms of these three samples are almost identical showing an aliphatic homology ranging from C_7 to C_{19}. Generally the pyrograms show a type III kerogen fingerprint.

M-7694 (3391m), M-7704 (3481m), M-7716 (3587m) and M-7728 (3695m).

The pyrograms of these four samples are very similar showing an n-alkene/n-alkane homology ranging from C_7 to C_{25} with a moderate content of aromatics, i.e. a type II kerogen fingerprint.

Gas Chromatography - Mass Spectrometry (GC-MS)

Seven samples were picked for GC-MS analysis, 3 shale samples from 2878 - 2914m and 4 claystones from 3391 - 3695m. The same samples had undergone urea-adduction as discussed previously. The samples were analysed for triterpanes (m/e 191) and steranes (m/e 217) in the saturated hydrocarbon fractions, the GC-MS analyses performed after the urea-adduction. From the aromatic hydrocarbons the distribution of monoaromatic (m/e 239 and 253) and triaromatic (m/e 231) steranes was analysed.

Triterpanes

Mass chromatograms of m/e 191 represent the triterpane distribution, and calculated molecular parameters from these traces are given in Table 11.

The shallowest samples have nearly identical triterpane distribution, all having a relatively high content of the C_{28} - triterpane found in in North Sea wells. As discussed previously on the urea-adduction, the samples also contain a relatively high amount of a C_{27} - triterpane. This component has no prominent m/e 191 in the mass spectrum, and will thus not be seen clearly in the triterpane trace. The deepest of these 3 samples, M-7440, contains relatively more of both the C_{28} - component (Z) and the C_{29} -$\alpha\beta$- hopane (C). Apart from this difference the 3 chromatograms show similar fingerprints. From the content of the most stable isomers of these compounds, i.e. $\alpha\beta/\alpha\beta + \beta\alpha$ and %22S in Table 11, the samples can also be assigned to be of the same maturity, all moderately mature to mature. These 3 samples can be said to be different from the 4 deeper samples on the basis of the triterpane data. The content of C_{29} -$\alpha\beta$- hopane (C) is higher, while the C_{28} - component could not be detected. This suggests another source rock for the hydrocarbons found in the deeper samples. The maturity parameters in Table 11 assign the saturated hydrocarbons in these samples as slightly less mature than in the 3 samples from zone E.

Steranes

Table 12 gives the calculated molecular ratios from the sterane mass chromatograms (m/e 217).

This data might also be used to divide the 7 samples into different groups. The 3 shallowest samples seem to be of slightly higher maturity than the 4 from the deepest zone. By looking at the fingerprints the 3 shallow samples can be said to be similar, all having a relatively high proportion of rearranged steranes (*). An extra peak (x) eluting immediately before the 20R-αα-C_{29} sterane, probably a 4-methyl sterane, is found in all the deeper samples. The relative concentration varies, but is higher (for all the samples) than in the samples from zone E above. The amount of rearranged steranes is low in 3 of the samples from the deep zone G, only in the deepest sample (M-7728) does the concentration of these components increase towards the level found in the shallowest samples.

Aromatic steranes

Only minor differences can be seen from the m/e 253 mass chromatograms (dimethyl monoaromatic steranes) of the 3 shallowest samples. The dissimilarities that can be seen are probably due to low resolution of the printer/plotter. On the basis of the m/e 253 traces the 4 deepest samples can be divided into two different groups. The samples from 3391 and 3481m contain ralatively more of the late eluting C_{28} and C_{29} components than of the lower molecular weight compounds. These deeper samples also contain two isomers which are not found in the samples from zone E. The samples from 3587 and 3695m have a fingerprint more similar to the shallowest samples, the deepest one being the most similar.

The m/e 239 mass chromatograms of the methylmonoaromatic steranes are not presented. These traces show a complex pattern of isomers, making it difficult to identify the individual components. The fingerprints show, however, the same pattern as for the m/e 253 traces.

The more simple patterns representing the triaromatic steranes are given as the m/e 231 mass chromatograms. Again the 3 shallowest samples show nearly identical patterns. M-7694 (3391m) and M-7704 (3481m) both contain relatively higher amounts of the late eluting C_{28} compounds than do the shallow samples. Further down in the deepest zone a trend towards more of the C_{26} and C_{27} components can be seen, leading to the deepest sample being nearly similar to the samples from zone E. This trend can also be seen from Table 13, where the degree of

side chain cracking of triaromatic steranes, is calculated. The more mature samples have a higher degree of the low molecular weight components. This assigns the aromatic hydrocarbons in the deepest zone as more mature than in the shallow zone.

CONCLUSION

On basis of the GC-MS analyses of the saturated hydrocarbons the maturity of the analysed samples can be assigned as nearly the same. A slight difference can be seen, giving a different trend to data discussed previously. The shallowest samples seem to be of slightly higher maturity than the deepest ones. The analyses of the aromatic steranes give a trend more similar to the other data, the deepest samples being somewhat more mature. This difference might be due to migrated hydrocarbons in the shallowest zone. If the saturated hydrocarbons have migrated more easily into this zone, this could explain the discrepancy.

CONCLUSIONS

Zone A: 1000 - 1670m.

The zone consists of conglomeratic, glauconitic, sandstones with some brown-grey siltstones at the base. The rich abundance of gas in the sandstones is mainly methane of diagenetic origin. The siltstones which have 1-3% organic carbon (good - rich) are immature (0.3% Ro, 1/1+ TAI, <425 T_{max}). Pyrolysis analyses indicate that the kreogens are type III or IV kerogens (mostly amorphous material according to visual kerogen analysis). The data indicates that the siltstones have a fair potential for gas.

Zone B: 1670 - 2200m

The zone consists mainly of brownish and greenish grey claystones with varying amounts of medium to dark grey siltstones. The claystones in the section from 1670 - 1880 metres have 1-2% organic carbon contents whereas most of the rest of the zone has only poor to fair (<1% TOC) abundances. The whole zone is immature (0.31 - 0.33% Ro, 1/1+ TAI, <415 T_{max}). Pyrolysis data indicates mostly type IV kerogens are present (woody and reworked woody material dominates according to visual kerogen analysis). The data indicates that the zone generally has a poor source rock potential.

Zone C: 2200 - 2644m.

This zone consists of varying amounts of grey, calcareous and silty claystones, grey siltstones and fine sandstones, becoming less sandy towards the bottom. The claystones and siltstones have fair to good organic carbon contents. The whole zone is immature (0.45, 0.49% Ro, 1/1+ TAI, <430 T_{max}). Pyrolysis data indicates mostly type IV kerogens (woody and reworked woody material dominates). The data indicates that this zone has a poor source rock potential.

Zone D: 2644 - 2752m.

The zone consists of grey-green, grey-brown and red-brown claystones. The red-brown claystones have very low organic carbon contents. The other claystone types show an increase from fair to good (also becoming darker in colour) with increasing depth. The whole zone is immature (0.33% Ro, 1/1+ TAI). Pyrolysis data indicates mostly type IV kerogen (woody and reworked woody material dominates according to visual kerogen). The data indicates that this zone has a poor source rock potential.

Zones A - D. (General)
This well section (particularly 2200 - 2752 metres), is marked by an abundance of C_2 - C_4 and C_5+ hydrocarbons (particularly zone C) which, in a relatively organic poor sequence, indicates migrated hydrocarbons. Rock-Eval production indices are very high for an immature sequence also suggesting migrated hydrocarbons. The very high percentage of C_{15}+ extractable hydrocarbons (71%, 94%) also supports this suggestion. However a potential source rock in zone E is probably not mature enough to have generated the extractable C_{15}+ hydrocarbons (but it may be responsible for the high gas contents of zone C).

Zone E: 2752 - 2986m.
Grey-dark claystones with fair to good TOC values dominate in this sequence, however below 2851m dark brown to dark grey fissile shale with roughly 7-10% TOC (rich) are present. There are rich C_1-C_4 and good C_{15}+ hydrocarbon abundances in this zone, which is immature - moderate mature (0.3% Ro, 1/1+ TAI, generally <420 T_{max}). Pyrolysis data indicates that the claystones have type III or type IV kerogen, whereas the organic rich shales have type II kerogens. Visual kerogen analysis indicates that this kerogen type II contains algal bodies including tasmanitids and Botryococcus, in amongst cuticular material embedded in an amorphous matrix. Richness data (TOC, petroleum potential, C_{15}+ extractable material) indicates that the shales have a rich potential as source rock for gas and oil.
The saturated sterane and triterpane distributions suggest that these shales are mature unlike the more conventional maturation parameters. It is possible that migrated hydrocarbons (observed in higher zones) from a deeper source have affected the data distributions. This zone is probably responsible for the high gas contents found in zone C.

Zone F: 2986 - 3346m.
Grey to dark grey claystones and sandstone are the main lithologies in this zone. The claystones have a good to rich organic carbon abundance but pyrolysis data indicates mostly type IV kerogens. The zone is moderately mature (0.46% Ro, 1/1+, 2- TAI). All the data suggest a generally poor source rock potential, any deviation from this assessment is probably due to caved material from zone E.

Zone G: 3346 - 3870m.

Consists of sandstones with some claystones, carbonaceous claystones and coals. The carbonaceous claystones have very variable but rich TOC values from 3.9 - 44.3% (higher values probably include coal stringers). The grey-dark grey claystones as in zone F have good to rich TOC values. The zone is moderately mature - mature (0.51 - 0.60% Ro, 1+/2- to 2- TAI, 430-440 T_{max}). The pyrolysis data indicates that the carbonaceous claystones are type II, mixed type II/III or type III kerogen (Visual kerogen data indicates woody and cuticular material). These claystones and coals have a good-rich potential as source rocks for gas and oil (paraffinic).

TABLE 1 a.

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

IKU no.	DEPTH m	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4/nC4
M 7270	1020	1767	2				8	1769	2	0.09	
M 7271	1040	3						3	0	0.00	
M 7272	1060	268						268	0	0.00	
M 7273	1080	6152	5					6157	5	0.07	
M 7274	1100	10592	8	16				10617	25	0.23	
M 7275	1120	105						105	0	0.00	
M 7276	1140	8951	8	18				8977	26	0.29	
M 7277	1160	1724	3					1726	3	0.17	
M 7278	1180	196						196	0	0.00	
M 7279	1200	1007						1007	0	0.00	
M 7280	1220	1113						1113	0	0.00	
M 7281	1240	3662	8					3670	8	0.21	
M 7282	1260	8227	17	48				8292	65	0.79	
M 7283	1280	908	1	4				913	5	0.59	
M 7284	1300	3198	5	18				3221	23	0.72	
M 7285	1320	2457	5	18			10	2480	22	0.90	
M 7286	1340	1539	3	10				1552	13	0.81	
M 7287	1360	1522	3				43	1526	3	0.22	
M 7288	1380	4699	12	57				4767	69	1.44	
M 7289	1400	O P E N L I D									
M 7290	1420	497	1	4				502	5	0.94	
M 7291	1440	4682	13	4				4699	17	0.36	
M 7292	1460	25584	70	27	10			25441	107	0.42	

TABLE I a.

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

	IKU no.	DEPTH m	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4 / nC4
M	7293	1480	8160	25	10				8195	35	0.42	
M	7294	1500	O P E N L I D									
M	7296	1520	5727						5727	0	0.00	
M	7298	1540	15485	33	28				15545	60	0.39	
M	7300	1560	9262	25	25				9311	49	0.53	
M	7302	1580	37479	85	71				37635	156	0.41	
M	7304	1600	1563	5	4				1572	9	0.57	
M	7306	1620	17492	42	26	6			17566	74	0.42	
M	7308	1640	2991	6	3				3000	9	0.31	
M	7310	1660	18521	41	23	6			18592	70	0.38	
M	7312	1680	22278	62	30				22370	92	0.41	
M	7314	1710	5560	15	8				5583	23	0.42	
M	7316	1720	2420	5	2	1			2428	8	0.32	
M	7318	1740	3054	6	2				3062	8	0.26	
M	7320	1760	20						20		0.00	
M	7322	1780	1092	3	1				1096	4	0.40	
M	7324	1800	4298	23	4				4324	26	0.61	
M	7326	1820	5765	46	7				5818	53	0.91	
M	7328	1840	3718	21	2				3742	23	0.62	
M	7330	1860	1415	8	1				1424	9	0.64	
M	7332	1880	3291	12	1				3304	13	0.39	
M	7334	1900	3428	14	2				3443	15	0.45	
M	7336	1920	743	3					746	3	0.46	

DATE : 16 - 9 - 82.

TABLE I a.

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

IKU no.	DEPTH m	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4/nC4
M 7338	1940	1147	6	1				1153	7	0.60	
M 7340	1960	4628	47	3				4678	50	1.07	
M 7342	1980	946	6					953	7	0.68	
M 7344	2000	3169	55	2				3226	57	1.75	
M 7346	2020	696	12	1				709	13	1.84	
M 7348	2040	3864	143	10				4016	153	3.80	
M 7350	2060	869	44	8	1			921	52	5.69	
M 7352	2080	4788	148	23				4959	171	3.45	
M 7354	2100	4146	75	12				4233	87	2.06	
M 7356	2120	432	12	4	1	1		450	18	3.94	0.77
M 7358	2140	2748	77	22	4	0	1	2851	103	3.62	
M 7360	2160	4467	174	63	12	21	3	4737	270	5.71	0.58
M 7362	2180	9419	187	61	16			9684	265	2.73	
M 7364	2200	15839	321	150	33	56	16	16400	561	3.42	0.59
M 7366	2220	6575	1346	2215	815	1276	1183	12227	5651	46.22	0.64
M 7368	2240	9091	2999	4365	1319	2185	1978	19959	10868	54.45	0.60
M 7370	2260	16069	4407	6275	1913	3131	2973	31794	15725	49.46	0.61
M 7372	2280	1597	230	141	325	536	434	2829	1233	43.57	0.61
M 7374	2300	13349	4571	5129	1295	2535	3936	26878	13530	50.34	0.51
M 7376	2320	16961	4942	5129	1314	2471	2957	30817	13856	44.96	0.53
M 7378	2340	42703	10051	8965	2114	4421	6851	68254	25551	37.43	0.48
M 7380	2360	39817	11282	8940	1797	3734	5322	65771	25954	39.46	0.48
M 7382	2380	187753	61799	46603	9723	17161	27	323039	135286	41.87	0.57

TABLE I a.

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

	IKU no.	DEPTH m	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4 / nC4
M	7384	2400	105874	29816	21258	4247	8137	12182	169331	63457	37.48	0.52
M	7386	2420	30693	7931	7441	1737	3566	6489	51368	20674	40.25	0.49
M	7388	2440	2446	529	552	184	418	1037	4129	1683	40.75	0.44
M	7390	2460	34534	6788	6901	2777	6333	16408	57334	22800	39.77	0.44
M	7392	2480	30546	4903	3858	1561	3559	11034	44426	13880	31.24	0.44
M	7394	2500	46162	6934	4678	1444	3139	10034	62357	16195	25.97	0.46
M	7396	2518	41365	5301	2908	858	1874	7913	52307	10942	20.92	0.46
M	7398	2536	14395	2098	1762	763	1763	13091	20781	6386	30.73	0.43
M	7400	2554	10575	1726	1738	771	1638	8059	16447	5873	35.71	0.47
M	7402	2572	19223	2386	1709	897	1713	12375	25928	6705	25.86	0.52
M	7404	2590	8472	1550	1132	317	581	3558	12052	3580	29.70	0.55
M	7406	2608	12885	1597	1091	407	750	6274	16730	3844	22.98	0.54
M	7408	2626	23147	2761	1409	270	484	3929	28071	4924	17.54	0.56
M	7410	2644	30589	1588	893	167	337	3469	33574	2985	8.89	0.50
M	7412	2662	3423	466	298	63	118	688	4368	945	21.64	0.53
M	7414	2680	2115	188	162	57	134	1755	2657	542	20.40	0.42
M	7416	2698	4201	83	57	24	60	1604	4426	224	5.07	0.39
M	7418	2716	1051	91	54	14	39	1021	1248	197	15.81	0.35
M	7420	2734	569	88	33	3	8	185	700	131	18.76	0.32
M	7422	2752	405	44	23	1	5	107	477	72	15.19	0.30
M	7424	2770	409	81	51	3	9	250	554	144	26.06	0.29
M	7426	2788	1221	185	100	10	21	296	1537	316	20.56	0.47
M	7428	2806	863	152	96	15	24	221	1150	288	25.00	0.62

DATE : 20 - 9 - 81.

TABLE I a.

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

	IKU no.	DEPTH m	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4/nC4
M	7430	2824	4223	618	303	57	72	338	5272	1049	19.90	0.80
M	7432	2842	1627	412	162	24	29	105	2254	627	27.81	0.84
M	7434	2860	15506	5950	3090	608	779	895	25933	10427	40.21	0.78
M	7436	2878	24700	8304	4946	930	1372	1292	40253	15553	38.64	0.68
M	7438	2896	6876	3531	2776	503	825	638	14511	7635	52.61	0.61
M	7440	2914	5707	2414	1618	260	466	461	10465	4758	45.46	0.56
M	7442	2932	4868	3283	2282	340	563	435	11336	6468	57.06	0.60
M	7444	2950	1663	635	529	118	185	431	3130	1468	46.89	0.64
M	7647	2968	699	279	205	44	69	146	1296	597	46.09	0.64
M	7649	2986	15	7	11				34	19	55.19	
M	7651	3004	569	224	166	25	46	86	1029	460	44.75	0.54
M	7653	3022	685	337	226	31	59	67	1339	653	48.81	0.52
M	7655	3040	167	73	69	11	26	36	346	180	51.91	0.43
M	7657	3058	353	103	87	14	29	52	586	233	39.81	0.48
M	7659	3076	90	54	57	12	20	35	232	142	61.30	0.59
M	7661	3094	414	189	126	28	41	54	798	384	48.09	0.68
M	7663	3112	416	291	230	53	82	99	1071	655	61.13	0.64
M	7665	3130	608	207	212	65	93	63	1185	577	48.72	0.70
M	7668	3157	154	56	70	20	28	23	328	174	53.00	0.69
M	7669	3166	1662	750	971	261	475	416	4119	2457	59.65	0.55
M	7671	3184	2315	1458	825	145	276	313	5019	2704	53.86	0.53
M	7673	3202	7702	1807	577	68	95	71	10324	2622	25.39	0.66
M	7675	3220	28	21	15	3	4	10	71	43	60.41	0.60

TABLE I a.

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

IKU no.	DEPTH m	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4 / nC4
M 7677	3238	701	371	201	28	53	83	1355	653	48.22	0.52
M 7679	3256	6371	2954	1158	107	181	183	10770	4399	40.85	0.59
M 7680	3265	2768	1724	897	115	204	231	5708	2940	51.51	0.56
M 7681	3274	4587	2400	1278	149	274	297	8687	4100	47.20	0.54
M 7683	3292	883	588	507	67	142	142	2189	1305	59.65	0.47
M 7685	3301	27	5	3				36	8	23.50	
M 7687	3328	819	153	69	8	11	9	1060	241	22.72	0.69
M 7689	3346	5978	2848	1318	160	222	124	10526	4549	43.21	0.72
M 7690	3355	50130	22590	6106	672	792	345	80290	30160	37.56	0.85
M 7692	3373	28086	11182	3379	364	460	226	43472	15385	35.39	0.79
M 7694	3391	93562	44446	11806	1200	1299	430	152313	58751	38.57	0.92
M 7696	3409	7403	3546	957	85	78	21	12070	4667	38.67	1.10
M 7698	3427	8858	1607	422	36	34	54	10957	2099	19.15	1.07
M 7700	3445	7364	2669	716	69	66	25	10885	3521	32.34	1.04
M 7702	3463	115	17	5				136	21	15.54	
M 7704	3481	87247	41324	8882	905	630	196	138989	51742	37.23	1.44
M 7706	3499	989	86	19	2			1097	107	9.79	
M 7708	3517	1048	145	38	4	4		1238	191	15.39	1.17
M 7710	3535	3681	1263	244	25	18	8	5231	1550	29.63	1.40
M 7712	3551	38909	16564	3074	261	201	67	59009	20100	34.06	1.30
M 7714	3569	54677	23625	4261	392	314	109	83269	28592	34.34	1.25
M 7716	3587	16966	5187	884	83	63	25	23183	6218	26.82	1.32
M 7718	3605	10486	3355	689	78	63	35	14671	4185	28.53	1.25

TABLE I a.

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

IKU no.	DEPTH m	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4/nC4
M 7720	3623	24341	11460	1958	112	127	62	37998	13657	35.94	0.88
M 7722	3641	11214	5461	1008	64	63	21	17811	6597	37.04	1.01
M 7724	3659	4429	2329	461	31	34	21	7284	2855	39.20	0.90
M 7726	3677	7747	3363	679	53	46	20	11889	4142	34.84	1.16
M 7728	3695	12849	5760	1104	79	68	24	19860	7011	35.30	1.15
M 7730	3713	12972	5036	897	52	46	18	19002	6030	31.74	1.13
M 7732	3731	33930	10177	2808	208	219	121	47340	13411	28.33	0.95
M 7734	3749	6393	1544	429	35	42	27	8443	2050	24.28	0.83
M 7736	3767	4263	687	217	18	26	13	5211	948	18.20	0.68
M 7738	3785	6724	1541	386	35	44	29	8730	2006	22.98	0.79
M 7740	3803	10896	2274	1039	143	255	198	14607	3710	25.40	0.56
M 7742	3820	20079	3752	1531	171	350	255	25883	5804	22.42	0.49
M 7744	3838	20742	3966	1036	89	135	104	25967	5226	20.12	0.66
M 7746	3856	12130	1613	367	25	44	27	14179	2049	14.45	0.58
M 7748	3870	11562	1210	298	21	39	22	13130	1568	11.94	0.55

DATE : 27 - 9 - 82.

TABLE I b.

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

IKU no.	DEPTH m	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4/nC4
M 7270	1020	534						534		0.00	
M 7271	1040	599					41	599		0.00	
M 7272	1060	1002					677	1002		0.00	
M 7273	1080	720					167	720		0.00	
M 7274	1100	1447					1306	1447		0.00	
M 7275	1120	800					42	800		0.00	
M 7276	1140	1406					0	1406		0.00	
M 7277	1160	1097					32	1097		0.00	
M 7278	1180	1339					0	1339		0.00	
M 7279	1200	1118					0	1118		0.00	
M 7280	1220	1224					88	1224		0.00	
M 7281	1240	1005					0	1005		0.00	
M 7282	1260	1550					90	1550		0.00	
M 7283	1280	1035	51				84	1086	51	4.70	
M 7284	1300	1565	119	21	51	13	121	1769	204	11.53	3.97
M 7285	1320	1454					158	1454		0.00	
M 7286	1340	1330	14				97	1345	14	1.08	
M 7287	1360	961					79	961		0.00	
M 7288	1380	1174					0	1174		0.00	
M 7289	1400	945		17			26	962	17	1.76	
M 7290	1420	1110	30	21			23	1161	51	4.38	
M 7291	1440	1190					174	1190	0	0.00	
M 7292	1460	1048	29	20			61	1097	49	4.48	

DATE : 6 - 8 - 82.

TABLE 1 h.

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

IKU no.	DEPTH m	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4/nC4
M 7293	1480	1355		13			85	1368	13	0.95	
M 7294	1500	863					132	863	0	0.00	
M 7296	1520	388						388	0	0.00	
M 7298	1540	723		29				752	29	3.85	
M 7300	1560	443						443	0	0.00	
M 7302	1580	446						446	0	0.00	
M 7304	1600	878		5				883	5	0.57	
M 7306	1620						100	0	0		
M 7308	1640	478	11	9				498	19	3.91	
M 7310	1660	568	18	12				598	30	5.01	
M 7312	1680	672	16	28				717	44	6.18	
M 7314	1710	504	15	10			323	529	24	4.63	
M 7316	1720	712	18	17			141	747	35	4.71	
M 7318	1740	577	50	53				680	103	15.17	
M 7320	1760	526	8	12				547	20	3.72	
M 7322	1780	156	19				127	175	19	10.98	
M 7324	1800	308	7	9			277	323	15	4.73	
M 7326	1820	86	12				362	98	12	11.82	
M 7328	1840	79					162	79	0	0.00	
M 7330	1860	85	10				252	95	10	10.47	
M 7332	1880	101	8				552	108	8	7.28	
M 7334	1900	89	6					95	6	6.51	
M 7336	1920	112	9				350	121	9	7.36	

DATE : 14 - 5 - 82.

TABLE I b.

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

IKU no.	DEPTH m	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4 / nC4
M 7338	1940	128	15				388	144	15	10.77	
M 7340	1960	73	8					80	8	9.46	
M 7342	1980	48					300	48	0	0.00	
M 7344	2000	46						46	0	0.00	
M 7346	2020	43					249	43	0	0.00	
M 7348	2040	47	13				291	60	13	22.00	
M 7350	2060	53	34	26	9	15	282	137	85	61.73	0.61
M 7352	2080	58	22	14	0	15	224	110	52	47.11	0.00
M 7354	2100	44	14					58	14	23.64	
M 7356	2120	54	16	17	10	24	303	121	67	55.22	0.41
M 7358	2140	52	20	19	11	28	163	130	78	59.75	0.39
M 7360	2160	36	18	22	13	36	262	126	89	71.08	0.36
M 7362	2180	58	10	11	5	15	200	100	41	41.64	0.35
M 7364	2200	190	16	24	12	31	339	273	83	30.43	0.39
M 7366	2220	225	79	187	112	302	2172	906	681	75.20	0.37
M 7368	2240	708	599	1752	1003	2525	8988	6587	5879	89.25	0.40
M 7370	2260	624	526	1546	906	2297	7576	5900	5276	89.42	0.39
M 7372	2280	1283	1268	3000	1415	4044	17364	11010	9727	88.35	0.35
M 7374	2300	1744	1241	2876	1415	3940	16790	11215	9472	84.45	0.36
M 7376	2320	869	828	1933	898	2673	15763	7201	6331	87.93	0.34
M 7378	2340	823	809	1933	870	2634	9551	7069	6245	88.35	0.33
M 7380	2360	1025	964	2089	871	2616	13801	7564	6539	86.45	0.33
M 7382	2380	1245	979	1895	719	2317	10084	7156	5910	82.59	0.31

DATE : 16 - 9 - 82.

TABLE I b.

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

IKU no.	DEPTH m	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4/nC4
M 7384	2400	1335	1086	2019	769	2420	11359	7629	6294	82.50	0.32
M 7386	2420	406	507	1240	543	1726	9185	4421	4015	90.82	0.31
M 7388	2440	252	214	524	292	1033	6220	2316	2063	89.11	0.28
M 7390	2460	278	208	505	311	1123	8092	2423	2145	88.54	0.28
M 7392	2480	321	156	283	181	668	7174	1609	1288	80.06	0.27
M 7394	2500	399	247	375	186	661	6407	1868	1469	78.65	0.28
M 7396	2518	250	142	215	83	272	3039	961	712	74.01	0.30
M 7398	2536	175	94	162	100	345	6630	876	701	80.07	0.29
M 7400	2554	202	102	198	128	445	5418	1075	873	81.23	0.29
M 7402	2572	117	50	74	55	193	2988	489	372	76.09	0.28
M 7404	2590	959	308	429	153	466	4729	2315	1356	58.57	0.33
M 7406	2608	190	103	161	94	288	5039	836	646	77.30	0.33
M 7408	2626	128	78	94	27	90	2819	416	288	69.23	0.30
M 7410	2644	137	105	212	60	205	183	719	582	80.88	0.29
M 7412	2662	74	46	91	28	107	1809	345	271	78.47	0.26
M 7414	2680	96	25	29	13	65	493	228	132	57.81	0.20
M 7416	2698	70	15	13	6	31	1191	134	65	48.06	0.20
M 7418	2716	87	17	14	5	23	633	145	58	40.12	0.20
M 7420	2734	46	38	45	5	32	1172	168	121	72.36	0.16
M 7422	2752	51	28	39			486	118	67	57.08	
M 7424	2770	61	24	46			537	131	70	53.37	
M 7426	2788	63	26	51			274	141	78	55.02	
M 7428	2806	56	32	70		36	333	193	137	71.14	0.00

DATE : 20 - 9 - 82.

TABLE I b.

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

IKU no.	DEPTH m	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4/nC4
M 7430	2824	82	115	206	44	116	272	562	480	85.33	0.38
M 7432	2842	179	485	691	137	286	575	1778	1599	89.93	0.48
M 7434	2860	667	2176	3210	797	1585	1895	8435	7768	92.09	0.50
M 7436	2878	1684	7864	14287	3738	7345	7956	34918	33234	95.18	0.51
M 7438	2896	2014	11209	24344	6374	12366	11250	56306	54293	96.42	0.52
M 7440	2914	3691	10550	18218	4112	7783	5030	44353	40662	91.68	0.53
M 7442	2932	821	3577	7716	1955	4309	3998	18380	17559	95.53	0.45
M 7444	2950	164	305	849	315	795	1822	2428	2264	93.23	0.40
M 7647	2968	183	428	739	242	552	1406	2144	1961	91.45	0.44
M 7649	2986	148	158	417	130	391	1707	1244	1096	88.07	0.33
M 7651	3004	157	480	748	181	495	1558	2061	1904	92.37	0.36
M 7653	3022	296	976	1522	358	1010	2024	4162	3866	92.90	0.35
M 7655	3040	466	660	1171	390	1100	5420	3788	3322	87.70	0.35
M 7657	3058	514	419	1042	363	1011	4579	3348	2834	84.65	0.36
M 7659	3076	171	419	960	327	848	2819	2726	2555	93.72	0.39
M 7661	3094	224	335	707	269	687	2502	2222	1998	89.93	0.39
M 7663	3112	215	200	506	192	561	1897	1674	1458	87.13	0.34
M 7665	3130	372	552	1620	711	1981	3972	5235	4863	92.89	0.36
M 7668	3157	245	492	1710	687	1910	3222	5044	4799	95.14	0.36
M 7669	3166	229	374	1563	706	1971	3172	4844	4615	95.28	0.36
M 7671	3184	434	1196	2108	700	2000	4390	6438	6005	93.26	0.35
M 7673	3202	5398	4966	3566	772	2075	5514	16776	11378	67.82	0.37
M 7675	3220	594	1391	1678	403	1104	4350	5175	4581	88.52	0.37

TABLE I b.

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

	IKU no.	DEPTH m	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4/nC4
M	7677	3238	416	596	734	177	457	1412	2380	1964	82.51	0.39
M	7679	3256	1687	3298	3093	608	1585	3644	10272	8584	83.57	0.38
M	7680	3265	544	1162	1640	330	883	1859	4559	4015	88.06	0.37
M	7681	3274	828	2014	2287	377	1047	2249	6551	5723	87.36	0.36
M	7683	3292	360	252	647	205	611	2378	2074	1715	82.65	0.34
M	7685	3301	971	930	1124	232	635	1906	3892	2920	75.04	0.36
M	7687	3328	1061	1964	1751	292	775	1724	5842	4781	81.84	0.38
M	7689	3346	742	2213	2590	494	1218	2220	7257	6515	89.78	0.41
M	7690	3355	18577	27946	9840	860	1718	838	58942	40365	68.48	0.50
M	7692	3373	9588	16514	7830	723	1641	1088	36296	26708	73.58	0.44
M	7694	3391	33664	38006	17054	1306	2418	854	92448	58784	63.59	0.54
M	7696	3409	65345	41373	24935	1752	2776	981136180	70835		52.02	0.63
M	7698	3427	79458	47353	26722	1871	2644	926158047	78589		49.72	0.71
M	7700	3445	36081	34678	14640	1118	2068	1089	88586	52505	59.27	0.54
M	7702	3463	35761	27078	9754	831	1412	762	74836	39075	52.21	0.59
M	7704	3481	92794	54115	29965	2530	2322	697181726	88932		48.94	1.09
M	7706	3499	17071	10523	4219	454	812	886	33077	16007	48.39	0.56
M	7708	3517	11117	10750	5098	575	1108	896	28647	17530	61.19	0.52
M	7710	3535	82514	45753	18525	1493	1946	916150232	67717		45.08	0.77
M	7712	3551	119575	40055	27978	2571	2554	943192732	73157		37.96	1.01
M	7714	3569	104286	34105	23659	2174	2340	876166564	62278		37.39	0.93
M	7716	3587	67028	28494	9004	1040	1103	883106669	39640		37.16	0.94
M	7718	3605	34313	14594	9251	866	1040	465	60064	25751	42.87	0.83

DATE : 27 - 9 - 82.

TABLE I b.

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

IKU no.		DEPTH m	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4/nC4
M	7720	3623	46970	32206	9003	956	949	419	90004	43034	47.81	0.80
M	7722	3641	66896	45523	11856	951	1208	400	126465	59569	47.10	0.79
M	7724	3659	32414	30279	9187	732	1030	402	73641	41227	55.98	0.71
M	7726	3677	66543	47632	14819	1308	1644	587	131948	65405	49.57	0.79
M	7728	3695	75558	40674	10448	838	1104	420	128615	53056	41.25	0.75
M	7730	3713	108836	61198	19453	1320	1519	323	192326	83491	43.41	0.87
M	7732	3731	37678	54361	23183	218	3109	1090	118550	80872	68.22	0.07
M	7734	3749	12296	20649	11049	1159	1780	719	46674	34637	73.89	0.65
M	7736	3767	11648	15611	8750	999	1710	948	38717	27069	69.92	0.58
M	7738	3785	15791	21671	11087	1243	2336	1375	52128	36337	69.71	0.53
M	7740	3803	7139	13552	9244	1568	3862	5071	35364	28226	79.81	0.41
M	7742	3820	3130	6962	5402	933	2321	3203	18747	15618	83.31	0.40
M	7744	3838	9341	13012	6797	968	2058	2646	32176	22835	70.97	0.47
M	7746	3856	2555	5101	3135	714	850	1111	12355	9800	79.32	0.84
M	7748	3870	1884	3483	2012	281	382	471	8041	6158	76.58	0.73

DATE : 27 - 9 - 82.

TABLE I c.

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

IKU no.	DEPTH m	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4 / nC4
M 7270	1020	2300	2				8	2302	2	0.07	
M 7271	1040	602					41	602	0	0.00	
M 7272	1060	1270					677	1270	0	0.00	
M 7273	1080	6872	5				167	6877	5	0.07	
M 7274	1100	12038	8	16			1306	12063	25	0.21	
M 7275	1120	905					42	905	0	0.00	
M 7276	1140	10357	8	18				10383	26	0.25	
M 7277	1160	2820	3				32	2823	3	0.10	
M 7278	1180	1535						1535	0	0.00	
M 7279	1200	2125						2125	0	0.00	
M 7280	1220	2337					88	2337	0	0.00	
M 7281	1240	4667	8					4674	8	0.17	
M 7282	1260	9777	17	48			90	9842	65	0.66	
M 7283	1280	1942	52	4			84	1999	56	2.83	
M 7284	1300	4763	124	39	51	13	121	4990	227	4.55	3.97
M 7285	1320	3912	5	18			168	3934	22	0.57	
M 7286	1340	2870	17	10			97	2897	27	0.93	
M 7287	1360	2484	3				122	2487	3	0.13	
M 7288	1380	5873	12	57				5942	69	1.16	
M 7289	1400	945	0	17			26	962	17	1.76	
M 7290	1420	1608	31	25			23	1663	56	3.34	
M 7291	1440	5872	13	4			174	5889	17	0.29	
M 7292	1460	26582	99	47	10		61	26738	156	0.58	

DATE : 6 - 9 - 82.

TABLE I c.

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

	IKU no.	DEPTH m	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4 / nC4
M	7293	1480	9515	25	23			85	9563	48	0.50	
M	7294	1500	863					132	863	0	0.00	
M	7296	1520	6115						6115	0	0.00	
M	7298	1540	16208	33	57				16297	89	0.55	
M	7300	1560	9705	25	25				9754	49	0.50	
M	7302	1580	37925	85	71				38081	156	0.41	
M	7304	1600	2441	5	9				2455	14	0.57	
M	7306	1620	17492	42	26	6		100	17566	74	0.42	
M	7308	1640	3469	16	12				3498	29	0.82	
M	7310	1660	19089	59	35	6			19189	100	0.52	
M	7312	1680	22950	78	58				23087	137	0.59	
M	7314	1710	6064	30	18			323	6112	48	0.78	
M	7316	1720	3131	23	19	1		141	3174	43	1.36	
M	7318	1740	3631	56	55				3742	111	2.97	
M	7320	1760	547	8	12				567	20	3.59	
M	7322	1780	1248	23	1			127	1272	24	1.86	
M	7324	1800	4606	29	13			277	4647	42	0.90	
M	7326	1820	5851	58	7			362	5916	65	1.09	
M	7328	1840	3797	21	2			162	3821	23	0.61	
M	7330	1860	1500	18	1			252	1519	19	1.25	
M	7332	1880	3392	20	1			552	3413	21	0.61	
M	7334	1900	3516	20	2				3538	22	0.61	
M	7336	1920	855	12				350	868	12	1.43	

DATE : 16 - 9 - 80.

TABLE I c.

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

	IKU no.	DEPTH m	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4/nC4
M	7338	1940	1275	22	1			388	1297	22	1.72	
M	7340	1960	4701	54	3				4758	58	1.21	
M	7342	1980	994	6				300	1001	7	0.65	
M	7344	2000	3215	55	2				3272	57	1.73	
M	7346	2020	739	12	1			249	752	13	1.73	
M	7348	2040	3910	156	10			291	4076	166	4.07	
M	7350	2060	921	78	33	10	15	282	1058	137	12.96	0.66
M	7352	2080	4846	170	38		15	224	5069	223	4.40	0.00
M	7354	2100	4191	89	12				4291	101	2.35	
M	7356	2120	486	28	21	11	25	303	571	84	14.81	0.42
M	7358	2140	2801	97	41	15	28	165	2982	181	6.07	0.54
M	7360	2160	4503	193	84	25	57	265	4863	360	7.40	0.44
M	7362	2180	9477	198	72	22	15	200	9783	306	3.13	1.46
M	7364	2200	16029	337	174	45	87	356	16672	644	3.86	0.52
M	7366	2220	6800	1425	2402	927	1579	3354	13133	6333	48.22	0.59
M	7368	2240	9799	3598	6117	2322	4711	10966	26546	16747	63.09	0.49
M	7370	2260	16693	4933	7821	2819	5428	10549	37694	21002	55.72	0.52
M	7372	2280	2880	1499	3141	1740	4580	17798	13839	10960	79.19	0.38
M	7374	2300	15092	5812	8005	2710	6475	20127	38094	23001	60.38	0.42
M	7376	2320	17831	5770	7062	2212	5144	18720	38018	20187	53.10	0.43
M	7378	2340	43527	10860	10897	2984	7055	16402	75323	31796	42.21	0.42
M	7380	2360	40842	12246	11029	2868	6350	19123	73335	32493	44.31	0.45
M	7382	2380	188998	62779	48498	10441	19478	32199	330195	141197	42.76	0.54

DATE : 16 - [illegible] - 81.

TABLE I c.

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

	IKU no.	DEPTH m	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4 / nC4
M	7384	2400	107209	30902	23277	5016	10556	23541	176960	69751	39.42	0.48
M	7386	2420	31099	8438	8680	2280	5292	15675	55789	24690	44.26	0.43
M	7388	2440	2699	743	1076	476	1451	7258	6444	3746	58.12	0.33
M	7390	2460	34812	6995	7406	3088	7456	24500	59757	24945	41.74	0.41
M	7392	2480	30867	5059	4141	1742	4228	18208	46036	15168	32.95	0.41
M	7394	2500	46561	7181	5053	1629	3801	16441	64225	17664	27.50	0.43
M	7396	2518	41615	5443	3123	940	2146	10951	53268	11653	21.88	0.44
M	7398	2536	14570	2192	1924	863	2109	19721	21657	7087	32.72	0.41
M	7400	2554	10776	1828	1936	899	2083	13476	17522	6745	38.50	0.43
M	7402	2572	19340	2436	1783	951	1906	15363	26417	7077	26.79	0.50
M	7404	2590	9431	1857	1561	470	1048	8286	14367	4936	34.36	0.45
M	7406	2608	13075	1699	1252	501	1038	11313	17565	4490	25.56	0.48
M	7408	2626	23275	2839	1503	297	573	6748	28487	5212	18.30	0.52
M	7410	2644	30727	1693	1105	227	541	3653	34293	3566	10.40	0.42
M	7412	2662	3497	512	389	91	224	2497	4713	1216	25.80	0.40
M	7414	2680	2211	213	192	70	199	2248	2885	674	23.36	0.35
M	7416	2698	4271	98	71	30	91	2795	4560	289	6.34	0.33
M	7418	2716	1138	108	68	18	61	1654	1393	255	18.34	0.30
M	7420	2734	615	126	79	8	40	1357	868	253	29.11	0.20
M	7422	2752	455	72	62	1	5	593	595	140	23.49	0.30
M	7424	2770	471	106	97	3	9	787	685	214	31.30	0.29
M	7426	2788	1284	211	151	10	21	570	1678	393	23.45	0.47
M	7428	2806	919	184	167	15	60	554	1343	425	31.62	0.25

DATE : 20 - 9 - 82.

TABLE 1 c.

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

	IKU no.	DEPTH m	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4/nC4
M	7430	2824	4305	732	508	101	187	611	5834	1529	26.20	0.54
M	7432	2842	1806	896	853	161	315	679	4032	2226	55.21	0.51
M	7434	2860	16173	8126	6301	1405	2363	2790	34368	18195	52.94	0.59
M	7436	2878	26384	16168	19233	4668	8717	9247	75171	48787	64.90	0.54
M	7438	2896	8889	14739	27120	6877	13191	11868	70817	61927	87.45	0.52
M	7440	2914	9398	12964	19836	4372	8249	5491	54818	45420	82.86	0.53
M	7442	2932	5689	6860	10001	2295	4872	4433	29716	24027	80.86	0.47
M	7444	2950	1827	940	1379	433	980	2252	5559	3731	67.13	0.44
M	7647	2968	882	707	945	286	621	1552	3441	2558	74.36	0.46
M	7649	2986	164	185	428	130	391	1707	1278	1115	87.20	0.33
M	7651	3004	726	704	914	205	541	1643	3090	2364	76.51	0.38
M	7653	3022	981	1314	1748	388	1069	2090	5501	4520	82.17	0.36
M	7655	3040	632	733	1240	401	1127	5456	4134	3502	84.70	0.36
M	7657	3058	867	522	1129	377	1040	4632	3934	3068	77.97	0.36
M	7659	3076	261	473	1017	339	868	2854	2958	2697	91.18	0.39
M	7661	3094	638	524	833	297	727	2557	3020	2382	78.87	0.41
M	7663	3112	632	490	736	244	643	1996	2745	2113	76.98	0.38
M	7665	3130	980	758	1832	776	2074	4035	6420	5441	84.74	0.37
M	7668	3157	399	548	1780	706	1938	3245	5372	4973	92.57	0.36
M	7669	3166	1891	1125	2534	967	2447	3587	8963	7072	78.91	0.40
M	7671	3184	2749	2654	2938	846	2276	4703	11457	8708	76.01	0.37
M	7673	3202	13101	6052	4143	835	2170	5585	27101	14000	51.66	0.38
M	7675	3220	632	1411	1693	411	1109	4359	5246	4623	88.14	0.37

TABLE I c.

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

	IKU no.	DEPTH m	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4 / nC4
M	7677	3238	1118	968	935	204	510	1495	3734	2617	70.07	0.40
M	7679	3256	8058	6252	4251	715	1766	3827	21042	12984	61.70	0.40
M	7680	3265	3312	2886	2538	445	1087	2090	10268	6955	67.74	0.41
M	7681	3274	5415	4413	3564	525	1320	2546	15238	9823	64.47	0.40
M	7683	3292	1243	840	1154	273	753	2520	4263	3020	70.84	0.36
M	7685	3301	999	935	1127	232	635	1906	3927	2929	74.57	0.36
M	7687	3328	1881	2117	1820	299	786	1733	6903	5022	72.76	0.38
M	7689	3346	6719	5062	3908	654	1440	2345	17784	11064	62.22	0.45
M	7690	3355	68707	50536	15946	1533	2510	1183	139233	70525	50.65	0.61
M	7692	3373	37675	27696	11209	1087	2102	1313	79768	42093	52.77	0.52
M	7694	3391	127226	82451	28860	2506	3718	1284	244761	117535	48.02	0.67
M	7696	3409	72748	44919	25892	1837	2854	1002	148250	75502	50.93	0.64
M	7698	3427	88317	48960	27143	1907	2677	980	169004	80688	47.74	0.71
M	7700	3445	43445	37347	15356	1188	2134	1064	99470	56026	56.32	0.56
M	7702	3463	35876	27095	9759	831	1412	762	74973	39097	52.15	0.59
M	7704	3481	180042	95439	38846	3436	2952	892	320715	140673	43.86	1.16
M	7706	3499	18060	10609	4238	456	812	886	34174	16114	47.15	0.56
M	7708	3517	12165	10895	5135	580	1111	896	29885	17721	59.30	0.52
M	7710	3535	86196	47016	18769	1518	1964	924	155463	69267	44.56	0.77
M	7712	3551	158484	56619	31051	2832	2755	1010	251741	93257	37.04	1.03
M	7714	3569	158963	57731	27919	2566	2654	985	249833	90870	36.37	0.97
M	7716	3587	83994	33681	9888	1123	1166	408	129052	45058	35.32	0.96
M	7718	3605	44799	17950	9939	944	1103	500	74736	29936	40.06	0.86

DATE : 27 - 9 - 82.

TABLE I c.

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

	IKU no.	DEPTH m	C1	C2	C3	iC4	nC4	C5+	SUM C1-C4	SUM C2-C4	WET-NESS (%)	iC4/nC4
M	7720	3623	71311	43666	10962	968	1096	482128002	56691	44.29	0.88	
M	7722	3641	78111	50984	12895	1015	1272	421144276	66166	45.36	0.80	
M	7724	3659	36842	32607	9648	763	1064	423 80925	44082	54.47	0.72	
M	7726	3677	74290	50995	15498	1362	1692	607143838	69548	48.35	0.80	
M	7728	3695	88407	46436	11547	912	1173	444148474	60067	40.46	0.78	
M	7730	3713	121808	66234	20350	1372	1565	3412113328	89521	42.36	0.88	
M	7732	3731	71608	64538	25991	426	3329	1211165090	94269	56.53	0.13	
M	7734	3749	18629	22193	11479	1194	1822	746 55817	36607	66.32	0.66	
M	7736	3767	15911	16298	8967	1017	1736	961 43923	28018	63.78	0.59	
M	7738	3785	22515	23212	11473	1278	2380	1404 60858	38343	63.00	0.54	
M	7740	3803	18035	15825	10283	1711	4117	5269 49971	31936	63.91	0.42	
M	7742	3820	23208	10714	6933	1104	2671	3458 44630	21421	48.00	0.41	
M	7744	3838	30083	16978	7833	1057	2193	2751 58144	28061	48.26	0.48	
M	7746	3856	14686	6714	3503	739	894	1138 26535	11849	44.66	0.83	
M	7748	3870	13446	4693	2309	302	422	493 21172	7726	36.49	0.72	

DATE : 27 - 9 - 82.

IKU

Lithology and Total Organic Carbon measurements

TABLE NO.: II
WELL NO.: 6407/2-1

Sample	Depth (m)	TOC	Lithology
M-7270	1000-1020		10% Sand, fine to very coarse, but other minerals, such as hornblende and feldspar, angular to subrounded. 80% Rock fragments of plutonic and metamorphic origin. 10% Casing cement.
M-7271	1020-1040		60% Sand, as above. 35% Rock fragments, as above. 5% Casing cement.
M-7272	1040-1060		50% Sand, as above. 50% Rock fragments, as above.
M-7273	1060-1080		40% Sand, as above. 60% Rock fragments, as above. Sm.am. Shell fragments.
M-7274	1080-1100		60% Sand, as above. 40% Rock fragments, as above. Sm.am. Shell fragments. Pyrite.
M-7275	1100-1120		60% Sand, as above. 40% Rock fragments, as above. Sm.am. Shell fragments; Garnet; Pyrite.
M-7276	1120-1140		70% Sand, as above. 30% Rock fragments. Sm.am. Shell fragments.
M-7278	1160-1180		40% Sand, as above. 60% Rock fragments, as above. Sm.am. Mica. Pyrite. Shell fragments.
M-7279	1180-1200		60% Sand, as above, fine to coarse, angular to rounded. 40% Rock fragments, as above. Sm.am. Shell fragments. Chalk, white. Kyanite.
M-7280	1200-1220		60% Sand, as above. 40% Rock fragments, as above. Sm.am. Shell fragments. Chalk, white.

IKU

Lithology and Total Organic Carbon measurements

TABLE NO.: II
WELL NO.: 6407/2-1

Sample	Depth (m)	TOC	Lithology
M-7281	1220-1240		60% Sand, as above. 39% Rock fragments, as above. 1% Shell fragments. Sm.am. Forams
M-7282	1240-1260		60% Sand, as above. 40% Rock fragments, as above. Sm.am. Shell fragments. ?Coal. Forams. Pyrite.
M-7283	1260-1280		70% Sand, as above. 30% Rock fragments, as above. Sm.am. Shell fragments. Pyrite. Glauconite, very dark green. Chalk, white.
M-7284	1280-1300		70% Sand, as above. 30% Rock fragments, as above. Sm.am. Shell fragments. Pyrite. Coal, black, silty.
M-7285	1300-1320		40% Sand, as above. 60% Rock fragments as above. Sm.am. ?Coal. Shell fragments.
M-7286	1320-1340		50% Sand, as above. 50% Rock fragments, as above. 2% Shell fragments. Sm.am. Wood fragments. Pyrite.
M-7287	1340-1360		40% Sand, as above. 60% Rock (metamorphic and plutonic) fragments. Sm.am. Shell fragments. Pyrite.
M-7288	1360-1380		70% Sand, as above. 30% Rock fragments, as above, now including well cemented sandstone and grey claystone. Sm.am. Pyrite (after bioturbation). Shell fragments.

IKU

Lithology and Total Organic Carbon measurements

TABLE NO.: II
WELL NO.: 6407/2-1

Sample	Depth (m)	TOC	Lithology
M-7289	1380-1400		70% Sand, as above. 30% Rock fragments, as above, no sedimentary rocks observed. Sm.am. Pyrite. Shell fragments.
M-7290	1400-1420		80% Sand, as above. 20% Rock fragments, as above. Sm.am. Pyrite. Coal.
M-7291	1420-1440		80% Glauconite, dark green. 15% Sand, fine to coarse, mainly quartz. 5% Rock fragments, as above. Sm.am. Shell fragments. Pyrite.
M-7292	1440-1460		20% Glauconite, as above. 70% Rock fragments, as above, but also includes some silty and sandy some light grey claystone. 10% Sand, as above. Sm.am. Shell fragments. Pyrite. Forams.
M-7293	1460-1480		10% Glauconite. 80% Metamorphic and plutonic rock fragments. 5% Limestone, brownish grey, blocky, microcrystalline. 5% Claystone, silty, light grey, micaceous, often glauconitic. Sm.am. Pyrite, indicating burrowing.
M-7294	1480-1500		30% Metamorphic and plutonic rock fragments. 40% Sand, as above, fine to very coarse. 5% Glauconite. 10% Siltstone, brownish grey, micaceous, sandy and clayey. 15% Limestone, brown, brownish grey, microcrystalline, blocky. Sm.am. Pyrite. Shell fragments.
M-7296	1510-1520		50% Siltstone/silty claystone, light brownish grey, occasionally pyritic, occasionally glauconitic. 30% Sand, as above. 15% Rock fragments, as above. 5% Glauconite. Pyrite. Shell fragments.

IKU

Lithology and Total Organic Carbon measurements

TABLE NO.: II
WELL NO.: 6407/2-1

Sample	Depth (m)	TOC	Lithology
M-7298	1530-1540	2.49	60% Siltstone, as above. 20% Sand, as above. 8% Rock fragments, as above. 2% Glauconite, as above. 10% Limestone, as above. Sm.am. Shell fragments. Pyrite. Forams.
M-7300	1550-1560	1.66	45% Siltstone, brownish grey, as above. 10% Sand, as above. 30% Claystone, very light brownish grey, micaceous, occasionally silty. 5% Limestone, as above. 10% Rock fragments, as above. Sm.am. Pyrite. Shell fragments. Forams. Glauconite.
M-7302	1570-1580	1.76	90% Siltstone, brownish grey, micromicaceous, calcareous. 5% Claystone, brownish grey, light brownish grey. 5% Sand, fine to very coarse. Sm.am. Rock fragments, plutonic and metamorphic. Coal. Chalk, white. Glauconite.
M-7304	1590-1600	2.01	40% Siltstone, brown, brownish grey, as above. 5% Claystone, as above. 35% Sand, fine to coarse, mainly quartz, poorly sorted, poorly cemented. 20% Rock fragments, as above. Sm.am. Shell fragments. Forams. Pyrite. Glauconite. Coal.
M-7306	1610-1620	2.52	90% Siltstone, brown, brownish grey, as above. 8% Rock fragments, as above. 2% Sand, fine to coarse, as above. Sm.am. Claystone, light brownish grey, brownish grey, as above. Glauconite. Pyrite. Shell fragments. Chalk, white, light brown.

IKU

Lithology and Total Organic Carbon measurements

TABLE NO.: II
WELL NO.: 6407/2-1

Sample	Depth (m)	TOC	Lithology
M-7308	1630-1640	2.12	100% Siltstone, brown, brownish grey. as above. Sm.am. Claystone, as above. Sand, as above. Rock fragments, as above. Glauconite. Limestone, brown.
M-7310	1650-1660	2.21	100% Siltstone, as above. Sm.am. Claystone, as above. Rock fragments, as above. Sand, fine to very coarse, as above. Glauconite. Pyrite.
M-7312	1670-1680	1.95	95% Claystone, light brownish grey, as above. 5% Siltstone, as above. Sm.am. Sand. Glauconite.
M-7314	1690-1700	2.11	95% Claystone, as above. 5% Siltstone. Sm.am. Sand. Glauconite. Limestone, brown. Shell fragments. Rock fragments.
M-7316	1710-1720	1.54	95% Claystone, as above, occasionally light greenish grey. 5% Siltstone, as above. Sm.am. Glauconite. Coal, black, shiny. Limestone, as above. Sand, as above. Pyrite.
M-7318	1730-1740	1.24	95% Claystone, light greenish grey, light brownish grey, occasionally silty, slightly calcareous. 5% Siltstone, brownish grey, occasionally dark brownish grey, micaceous, occasionally sandy. Sm.am. Sand, as above. Rock fragments, as above. Glauconite. Pyrite. Limestone, brownish grey, blocky, microcrystalline.

IKU

Lithology and Total Organic Carbon measurements

TABLE NO.: II
WELL NO.: 6407/2-1

Sample	Depth (m)	TOC	Lithology
M-7320	1750-1760	1.40	98% Claystone, as above. 2% Siltstone, as above. Sm.am. Sand, as above. Glauconite. Limestone, as above. Pyrite.
M-7322	1770-1780	1.34	98% Claystone, as above. 2% Siltstone, as above. Sm.am. Sand, as above. Coal. Pyrite. Sandstone, very fine to fine, brownish grey, well cemented.
M-7324	1790-1800	1.37	93% Claystone, as above, occasionally light grey, occasionally subfissile. 5% Siltstone, as above. 2% Limestone, brownish grey, brownish white, blocky. Sm.am. Sand, as above. Pyrite.
M-7326	1810-1820	1.23	95% Claystone, light greenish and brownish grey, grey, as above. 5% Siltstone. Sm.am. Limestone, brownish grey, as above. Sand. Rock fragments. Pyrite. Sandstone, very fine to fine.
M-7328	1830-1840	1.48	95% Claystone, brownish grey, greenish grey, light brownish, light greenish grey, grey, brown. 5% Siltstone, brownish grey, as above. Sm.am. Limestone, as above.
M-7330	1850-1860	1.25	90% Claystone, as above. 5% Claystone, brown to dark brown. 5% Siltstone, brownish grey. Sm.am. Pyrite. Limestone, as above. Sandstone, very fine to fine brown, immature, well cemented. Forams. Coal.

IKU

Lithology and Total Organic Carbon measurements

TABLE NO.: II
WELL NO.: 6407/2-1

Sample	Depth (m)	TOC	Lithology
M-7332	1870-1880	1.00	95% Claystone, light brownish and greenish grey, brown, often mottled, occasionally silty, occasionally off-white. 5% Siltstone, brown, light brown. Sm.am. Pyrite. Limestone, light brown, brown. ?Tuff.
M-7334	1890-1900	0.63	95% Claystone, off-white, light brown, light green, brown, occasionally mottled, occasionally silty. 5% Siltstone, medium to dark brown, micaceous. Sm.am. Limestone, as above. Forams. Pyrite. Shell fragments.
M-7336	1910-1920	0.64	98% Claystone, light green light brown, occasionally brown, non-calcareous. 2% Siltstone, brown, micaceous. Sm.am Limestone, grey, brownish grey, brown. Tuff, bluish grey, occasionally laminated. Rock fragments, as above. Pyrite.
M-7338	1930-1940	2.00 0.59	80% Claystone, as above, often with fine laminae (tuffaceous). 20% Siltstone, brown, brownish grey, grey, micaceous, probably tuffaceous. Sm.am. Limestone, as above. ?Tuff Sandstone, similar to above siltstone, very fine to fine, immature.
M-7340	1950-1969	1.82 0.50	70% Claystone, as above. 30% Siltstone, as above. Sm.am. Limestone, as above. ?Tuff. Sandstone, as above. Pyrite.
M-7342	1970-1980	0.49	93% Claystone, light green, light brown, as above, with some white claystone. 2% Claystone, reddish brown. 5% Siltstone, as above. Sm.am. Pyrite. Limestone, as above.

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TABLE NO.: II
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Sample	Depth (m)	TOC	Lithology
M-7344	1990-2000	0.27	80% Claystone, light grey, light greenish grey, light brownish grey, slightly calcareous, occasionally subfissile, occasionally mottled.
		0.0	15% Claystone, reddish brown, occasionally light purplish grey, calcareous, blocky. 5% Siltstone, brownish grey, as above. Sm.am. Pyrite. Limestone, as above.
M-7346	2010-2020	0.28	65% Claystone, light grey, light greenish grey, light brownish grey.
		0.0	15% Claystone, reddish brown, purple.
		0.36	20% Siltstone, brownish grey, occasionally sandy. Sm.am. Limestone, dark brownish grey, brownish grey, brownish white.
M-7348	2030-2040	0.37	50% Claystone, light grey, light green, light brown, as above. 5% Claystone, reddish brown, as above.
		0.44	45% Siltstone/Silty claystone, medium to dark grey, dark brownish grey, medium to dark greenish grey, possibly tuffaceous. Sm.am. Limestone, as above. Pyrite.
M-7350	2050-2060	0.39	20% Claystone, off-white, light grey, light green, light brown, as above. 5% Claystone, reddish brown, as above.
		0.64	75% Siltstone, as above, possibly tuffaceous. Sm.am. Pyrite.
M-7352	2070-2080	0.20	70% Claystone, off-white, light grey, light green, light brown, slightly calcareous.
		1.63	30% Siltstone, brownish grey, occasionally laminated, possibly tuffaceous. Sm.am. Claystone, reddish brown. Pyrite. Tuff.
M-7354	2090-2100	0.29	90% Claystone, as above. 10% Siltstone, as above. Sm.am. Claystone, reddish brown. Limestone, light brown and brownish grey. Pyrite. Tuff.

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Sample	Depth (m)	TOC	Lithology
M-7356	2110-2120	0.54	95% Claystone, light grey, light greenish grey, light brownish grey, slightly more silty than above. 5% Siltstone, as above. Sm.am. Claystone, reddish brown. Limestone, dark brownish grey, blocky. Pyrite. Tuff.
M-7358	2130-2140	0.42	100% Claystone, off-white, light grey, grey. Sm.am. Siltstone, as above. Claystone, reddish brown. Pyrite. Tuff.
M-7360	2150-2160	0.64	100% Claystone, as above. Sm.am. Siltstone, as above. Claystones, reddish brown. Pyrite. Tuff.
M-7362	2170-2180	0.70	90% Claystone, as above. 5% Siltstone, probably tuffaceous, as above. 5% Coal, black shiny (?additive). Sm.am. Limestone, white to light grey, light brown. Pyrite. Tuff. Sandstone, very fine to fine, well cemented.
M-7364	2190-2200		90% Claystone, mainly light grey calcareous, occasionally white, light greenish and light brownish grey. 10% Coal, as above. Sm.am. Limestone, white (chalky) and grey (blocky). Pyrite. Siltstone, as above.
M-7366	2210-2220	0.52	85% Claystone, as above, mainly grey, calcareous. 10% Casing cement. 5% Coal, as above. Sm.am. Limestone, as above. Claystone, bright red, reddish brown, yellowish brown. Siltstone, as above.

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Lithology and Total Organic Carbon measurements

TABLE NO.: II
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Sample	Depth (m)	TOC	Lithology
M-7368	2230-2240	0.82 0.70	80% Claystone, silty grey, occasionally not silty. 20% Siltstone/very fine sandstone, grey. Sm.am. Pyrite. Chalky limestone. Green claystone.
M-7370	2250-2260	0.78 0.76	60% Claystone, silty, grey, as above. 40% Siltstone/very fine sandstone, as above. Sm.am. Pyrite. Glauconite. Limestone, grey, angular, blocky.
M-7372	2270-2280	1.01 1.03	40% Claystone, silty, grey, as above. 20% Siltstone, grey, light grey, as above. 40% Sandstone, very fine to fine, containing glauconite. Sm.am. Pyrite. Glauconite. Coal.
M-7374	2290-2300	1.28 0.91	60% Claystone, as above. 20% Siltstone,as above. 19% Sandstone, very fine to medium, angular to subangular, mainly quartz, moderately cemented. 1% Coal. Sm.am. Pyrite. Glauconite.
M-7376	2310-2320	1.00	100% Claystone, grey, occ. silty, with silt laminae grading to Siltstone, light grey to grey, occ. sandy, grading to Sandstone, light grey, very fine, moderately to well cemented. Sm.am. Pyrite.
M-7378	2330-2340	0.93	100% Claystone, grey, as above, grading to Siltstone, as above, grading to Sandstone as above. Sm.am. Pyrite; Coal, Reddish grey Claystone.
M-7380	2350-2360	1.13	100% Claystone, grey, grading with lenses of sand and silt grading to Siltstone and sandstone. Sm.am. Limestone, light brown; Coal; Pyrite.
M-7382	2370-2380	0.94	100% Claystone, grey, grading to silt and very fine Sandstone. Sm.am. Limestone, light brown; Coal, Pyrite, Mica.

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TABLE NO.: II
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Sample	Depth (m)	TOC	Lithology
M-7384	2390-2400	1.02	100% Claystone, grey, silty, often laminated, lenses and laminae are silty and sandy, grading to Siltstone and very fine sandstone. Sm.am. Light grey to white limestone (chalky) Coal; Pyrite.
M-7386	2410-2420	0.95	100% Claystone, grey, as above, but less silty and sandy, occ. laminated. Sm.am. Coal, Limestone, brownish grey. Chalk, pinkish white; Claystone, brick-red; Pyrite, Glauconite (trace).
M-7388	2430-2440	0.88	100% Claystone, gry with occ. sand and silt laminae, as above. Sm.am. Limestone, brownish white to buff; Coal.
M-7390	2450-2460	0.87	100% Claystone, grey, laminated with silt and sand laminae, grading to sandstone and Siltstone. Sm.am. Limestone, light brown; Pyrite.
M-7392	2470-2480	0.94	100% Claystone, grey, often laminated, with lenses and laminae of silt and sand; together with the Sand there is some Glauconite. Sm.am. Limestone, light brown, blocky; Pyrite; Coal.
M-7394	2490-2500	0.91	95% Claystone, grey, as above. 5% Limestone, light brown to brown, greyish brown. Pyrite.
M-7396	2509-2518	0.98	100% Claystone, grey, as above, grading to Siltstone and Sandstone. Sm.am. Limestone, light brown; Coal.
M-7398	2527-2536	1.00	95% Claystone, as above grading to Siltstone and Sandstone. 5% Limestone, light brown. Sm.am. Coal; Pyrite.
M-7400	2545-2554	1.02	95% Claystone, grey grading to Silt and Sandstone. 5% Limestone, brownish grey, Coal; Pyrite.

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Sample	Depth (m)	TOC	Lithology
M-7402	2563-2572	0.93	80% Claystone, grey, as above. 10% Limestone, light brownish grey, as above, 10% Additive (Lignosulfonate?). Sm.am. Pyrite; Coal.
M-7404	2581-2590	0.92	90% Claystone, grey, occ. silty and sandy, occ. grading to Siltstone and Sandstone, but less Silt and Sandstone than above. 5% Limestone, light brownish grey. 5% Additive (Lignosulfonate). Sm.am. Coal.
M-7406	2599-2608	1.01	85% Claystone, grey, occ. silty and sandy, occ. grading to Sand. 10% Limestone, light brown. 5% Additive (Lignosulfonate). Sm.am. Coal; Sand, as loose grains reaching coarse grain size; Glauconite.
M-7408	2617-2626	1.06	95% Claystone, as above, grading to Silt and Sandstone. 5% Limestone, light brown. Sm.am. Lignosulfonate.
M-7410	2638-2644	0.92	75% Claystone, grey, occ, brownish grey, grading to Siltstone. 15% Limestone, light brown, occ. dark brownish grey, blocky. 10% Additive (Lignosulfonate).
M-7412	2653-2662	0.76	90% Claystone, grey, occ. greenish grey, brownish grey, occ. grading to Siltstone. 2% Limestone, brown, light brown. 8% Additives/Lignosulfonate). Sm.am. Sandstone, fine to very fine, well cemented; Pyrite; ?Coal.
M-7413	2662-2671	0.94	98% Claystone, grey, occasionally brownish and greenish. 2% Limestone, light grey and brownish grey. Sm.am. Glauconite, additives.
M-7414	2671-2680	2.28	95% Claystone, grey, occ. brownish grey, as above. 2% Limestone, light grey, occ. dark brownish grey. 3% Additives (Lignosulfonate) Sm.am. Pyrite; Coal.

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Sample	Depth (m)	TOC	Lithology
M-7415	2680-2689	0.90	95% Claystone, grey. 5% Claystone, brownish grey and greenish grey. 2% Limestone (light brown). 3% Coal and Lignite additives. Sm.am. rust, Glauconite.
M-7416	2689-2698	0.83	85% Claystone, grey, occ. greenish grey, brownish grey grading to Siltstone. 5% Claystone, reddish brown. 5% Limestone, light brown, as above. 5% Additives (Lignosulfonate). Sm.am. Coal; Pyrite (trace).
M-7417	2698-2707	0.94	70% Claystone, grey, greenish and brownish grey. 10% Claystone, reddish brown. 5% Limestone, light brown, as above. 15% Lignite additive.
M-7418	2707-2716	1.10	80% Claystone, grey, greenish and brownish grey, as above. 5% Claystone, reddish brown. 5% Limestone, light brown, chalky or dark brown, blocky. 10% Additives. Sm.am Coal.
M-7419	2716-2725	1.12	70% Claystone, as above. 25% Lignite (additive?). 5% Limestone, as above.
M-7420	2725-2734	1.54	90% Claystone, medium to dark grey, probably more carbonaceous than above, micaceous. 10% Limestone, light brown, brownish grey, as above. Sm.am. Coal; Pyrite; Claystone, reddish brown.
M-7221	2734-2743	1.54	80% Claystone, light grey to grey and brownish grey. 20% Limestone, light brown and brownish grey. Sm.am. Glauconite; Coal.
M-7422	2743-2752	1.45	95% Claystone, grey to dark grey, subfissile, occ. silty. 5% Limestone, light brown, probably sideritic. Sm.am. Claystone, green.

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Sample	Depth (m)	TOC	Lithology
M-7423	2752-2761	1.33	95% Claystone, light grey to dark grey. 5% Claystone, reddish brown and greenish grey. 2% Limestone, light brownish grey. Sm.am. Glauconite.
M-7424	2761-2770	1.26	90% Claystone, as above, but occasionally brownish grey, brown. 5% Claystone, reddish grey and brownish red. 5% Limestone, grey, light brown, brownish grey, probably sideritic. Sm.am. Pyrite.
M-7425	2770-2779	1.10	80% Claystone, grey to dark grey, brownish grey. 10% Claystone, reddish brown. 5% Limestone, light brownish grey.
M-7426	2779-2788	1.09	90% Claystone, grey to dark grey, brownish grey, light grey, light brownish grey. 2% Claystone, reddish brown, as above. 8% Limestone, light brown grey, probably sideritic. Sm.am. Pyrite.
M-7427	2788-2797	1.26	80% Claystone, grey to dark grey, brownish grey, greenish grey. 15% Claystone, red/brown. 5% Limestone, light brown, grey as above.
M-7428	2797-2806	0.99 0.82	75% Claystone, grey grading to dark grey, subfissile. 20% Claystone, grey-brown. 5% Claystone, red-brown. obs. Claystone light grey. Sm.am. Siderite, yellowish brown.
M-7429	2806-2815	1.39	85% Claystone, light to dark grey. 10% Claystone, light grey to brown/grey and greenish grey. 5% Claystone, red-brown.
M-7430	2815-2824	1.44	85% Claystone, grey grading to dark grey. 10% Claystone, grey-brown, red-brown, obs. green. 5% Siderite, light brownish grey to brown.
M-7431	2824-2833	1.56	90% Claystone, light to dark grey. 7% Claystone, brownish to greenish grey. 3% Limestone, light brownish.

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Sample	Depth (m)	TOC	Lithology
M-7432	2833-2842	1.70	85% Claystone, grey to dark grey, subfissile. 5% Claystone, red-brown. 10% Limestone, white to grey-white. Sm.am. Limestone/Siderite, brownish to brown; Pyrite; light grey to green. Claystone.
M-7433	2842-2851	3.80	90% Claystone, grey to dark grey. 5% Claystone, red-brownish. 5% Limestone, light grey.
M-7434	2851-2860	1.79	65% Claystone, as above. 5% Claystone, red-brown.
		0.26	15% Claystone, light grey/white to greenish, some calcareous.
		8.97	15% Shale, dark brown-grey, very fissile to fissile, very silty. Sm.am. Limestone, white; Pyrite; Siderite.
M-7436	2869-2878	8.70	70% Shale, dark brown-grey, loose, papery fissile, very silty.
		1.87	20% Claystone, grey to dark grey (?caved). 5% Claystone, light as above. 5% Claystone, red-brown (caved). Sm.am. Limestone, white (?caved).
M-7438	2887-2896	8.59	93% Shale, as above. 7% Claystones as above (caved); Limestone (caved).
M-7439	2896-2905	9.65	90% Shale, as above. 5% Claystone, grey, as above, (caved). 5% Limestone, as above, (caved).
M-7440	2905-2914	7.15	90% Shale, as above. 10% Claystones, as above (caved); Sm.am. Limestone (caved).
M-7441	2914-2923	1.66	85% Claystone, grey to dark grey, brownish grey.
		8.58	15% Shale, as above.
M-7442	2923-2932	2.36	85% Claystone, subfissile, grey to dark grey and brown-grey, some light grey to white, red-brown, dark green.
		7.68	15% Shale, as above. Sm.am. Limestone, white; white Sandstone.

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Sample	Depth (m)	TOC	Lithology
M-7443	2932-2941	1.78	80% Claystone, light to dark grey, brownish grey.
		8.53	15% Shale, as above.
			3% Claystone, red-brown.
			2% Limestone, white, greenish grey.
M-7444	2941-2950		25% Sand, medium to coarse, subangular to angular, clear.
		1.72	65% Claystone, grey to dark grey.
			10% Claystone, red-brown.
			Sm.am. Claystone, light grey to white, some calcareous.
M-7647	2959-2968	1.80	78% Claystone, as above.
			10% Sand, as above.
			7% Claystone, red-brown.
			5% Claystone, green, light grey/white (some calcareous); Siderite; white Limestone.
M-7649	2977-2986		75% Claystone, grey to dark grey, as above
			20% Sand, as above, occasionally Calcite-cemented.
			5% Claystone, red-brown.
			Sm.am. Pyrite; Claystone, light.
M-7651	2995-3004	1.52	67% Claystone, as above.
			25% Sand, very fine to medium, clear.
			5% Claystone, red-brown.
			3% Claystone, grey-brown.
			Sm.am. Pyrite.
M-7653	3013-3022	2.36	85% Claystone, grey grading to dark, some grey-brown.
			15% Sand and some Sandstone, as above.
			Sm.am. Claystone, red-brown, light grey; Pyrite; Limestone, white.
M-7655	3031-3040	1.66	50% Claystone, grey to dark grey.
			50% Sand, fine-medium, rare coarse.
			3% Claystone, red-brown.
			Sm.am. Pyrite; Siderite.
M-7657	3049-3058		77% Sand, fine-medium, subangular-angular.
			20% Claystone, as above.
			3% Claystone, red-brown.

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Sample	Depth (m)	TOC	Lithology
M-7659	3067-3076	1.92	20% Sand, very fine to coarse. 77% Claystone, grey to dark grey. 3% Claystone, red-brown. Sm.am. Pyrite; Siderite; Claystone, light grey.
M-7661	3085-3094	2.41	80% Claystone, as above. 3% Claystone, red-brown. 15% Sand, as above. 3% Siderite; Pyrite; Claystone, light greenish grey.
M-7663	3103-3112	1.23	89% Claystone, grey to dark grey, silty, occasionally sandy parts, some grey-brown. 5% Sand/Sandstone, occasionally Glauconitic. 3% Claystone, red-brown. 3% Siderite. Sm.am. Claystone, light grey (greenish); Pyrite.
M-7665	3121-3130	1.39	87% Claystone, as above. 3% Claystone, red-brown Sandstone, fine, slightly glauconitic. 10% Siderite, hard, brown, light, microcrystalline.
M-7668	3148-3157	1.33	50% Sandstone, very fine, white, silty. 50% Claystone, as above. 2% Siderite. Sm.am. Pyrite.
M-7669	3157-3166	1.95	60% Claystone, dark grey-grey. 5% Silt/Claystone, grey-brown. 35% Sandstone, as above. Sm.am. Siderite; Pyrite; Claystone, green, red-brown.
M-7671	3175-3184	2.80	22% Claystone, as above. 5% Claystone, very silty, grey-brown. 70% Sand, medium to coarse, white. 2% Siderite. 1% Pyrite.
M-7673	3193-3202	2.05	65% Claystone, as above, some dark green. 3% Claystone, red-brown. 30% Sand, as above. 2% Siderite. Sm.am. Pyrite; Limestone, grey.

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Sample	Depth (m)	TOC	Lithology
M-7675	3211-3220	1.91	85% Sand/Sandstone, medium-coarse, white. 15% Claystone, as above. Sm.am. Claystone, grey-brown, red-brown; Pyrite; Siderite.
M-7677	3229-3238	1.68	88% Sand/Sandstone. 12% Claystone, as above.
M-7679	3247-3256		92% Sand, fine-coarse, white. 7% Claystone, dark grey-grey. 1% Siderite. Sm.am. Pyrite; red-brown; Claystone.
M-7680	3256-3265		94% Sand/Sandstone, fine to coarse, occasionally very coarse, white. 5% Claystone, dark grey-grey. 1% Siderite. Sm.am. Claystone, red-brown; Pyrite.
M-7681	3265-3274		94% Sand/Sandstone. 3% Claystone, dark grey. 3% Siderite. Sm.am. Pyrite.
M-7683	3283-3292	2.51	93% Sand/Sandstone, as above. 7% Claystone, dark grey to grey. Sm.am. Claystone, red-brown; Pyrite.
M-7685	3301-3310	1.94	80% Sandstone, fine-medium, coarse, white. 20% Claystone, dark grey grading to grey. Sm.am. Siderite; Claystone, red-brown; Pyrite.
M-7687	3319-3328	1.83	80% Sandstone, as above, with some Coal strings, occ. pyritic. 20% Claystone, dark grey, occasionally brownish. Sm.am. Claystone, red-brown.
M-7689	3337-3346	1.97	50% Sandstone, very fine to fine, white, some medium to coarse. 50% Claystone, dark grey to grey, silty. Sm.am. Siderite.
M-7690	3346-3355		80% Sandstone, as above. 5% Claystone, as above. 15% Coal to carbonaceous Claystone, dark grey to black.

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Sample	Depth (m)	TOC	Lithology
M-7692	3364-3373		88% Sandstone, very fine to fine, some medium to coarse.
		58.71	8% Coal to carbonaceous Claystone.
		2.55	4% Claystone, dark grey/grey.
			Sm.am. Pyrite; red-brown Claystone.
M-7694	3382-3391		75% Sandstone, as above.
		71.98	10% Coal, black.
		16.06	10% carbonaceous Claystone, dark brown-grey.
			5% Claystone, grey-dark grey.
M-7696	3400-3409		30% Sandstone, partly cemented by Calcite.
		1.54	10% Claystone, dark grey to grey.
		51.83	60% Coal grading to carbonaceous Claystone.
M-7698	3418-3427		50% Sand, clear, medium to coarse.
		16.16	15% Claystone, carbonaceous, very silty, dark brown-grey to brown, interlaminated with Coal.
		62.90	30% Coal, black.
			5% Claystone, grey, dark grey.
			Sm.am. Siltstone, light grey-brown.
			Sm.am. Claystone, grey-brown, waxy; Siderite.
M-7700	3436-3445		80% Sand, as above, angular-subangular.
		53.40	10% Coal.
		3.22	10% Claystone, grey/dark grey, brown.
M-7702	3456-3463		70% Sand, as above, white.
		7.80	25% Claystone, dark grey to brownish, some grey, variably silty.
			5% Coal.
			Sm.am. Siderite.
M-7704	3472-3481	37.67	55% Carbonaceous Claystone, dark grey to very dark and brownish.
		68.64	25% Coal.
			15% Sand/Sandstone, fine-coarse.
			5% Claystone, grey, dark green.
			Sm.am. Siderite.
M-7706	3490-3499	1.66	85% Claystone, grey, grading to dark and brownish.
			5% Claystone, red-brown.
		24.35	10% Carbonaceous Claystone and Coal.
			Sm.am. Siderite; Sandstone.

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Sample	Depth (m)	TOC	Lithology
M-7708	3508-3517		75% Sand and some Sandstone (partly Calcite-cemented).
		5.54	15% Claystone, dark grey, partly carbonaceous, silty.
		0.95	10% Claystone, grey.
			1% Siderite.
			Sm.am. Coal; red-brown Claystone.
			Obs. Pyrite.
M-7710	3526-3535		25% Sand/Sandstone, fine-coarse, white.
		7.03	50% Claystone, carbonaceous, dark grey to grey-black and brownish.
		64.08	25% Coal, black.
			2% Claystone, grey, red-brown.
			Sm.am. Siderite.
			Obs. Pyrite.
M-7712	3542-3551	44.31	60% Carbonaceous Claystone, dark grey to black, grading to Coal.
		64.09	30% Coal, black.
			10% Sand/Sandstone.
M-7714	3560-3569	31.68	75% Carbonaceous and coaly Claystone, dark grey to grey-black and brownish.
		65.29	20% Coal.
			5% Sandstone.
			Sm.am. Claystone, grey, brown-grey.
M-7716	3578-3587	15.86	75% Carbonaceous Claystone, as above.
		61.91	20% Coal.
			5% Sandstone.
			Sm.am. Claystone, light grey-brown, occ. Coal-fragments; red-brown Claystone.
M-7718	3596-3605		60% Sand/Sandstone, medium to fine, occ. coarse, clear.
		9.27	45% Carbonaceous Claystone; as above.
			5% Coal.
M-7720	3614-3623		87% Sand, white, coarse to medium.
		4.19	10% Claystone, variably coaly and carbonaceous, dark grey to grey-black.
			3% Coal.
			Sm.am. Siderite.

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Sample	Depth (m)	TOC	Lithology
M-7722	3632-3641	3.90	25% Sand/Sandstone, as above. 65% Carbonaceous and coaly Claystone, dark grey to grey-black and brownish. 8% Coal. 2% Claystone, grey, friable. Sm.am. Claystone, light grey-brown, waxy; Siderite; red-brown Claystone.
M-7724	3650-3659		92% Sand, white, coarse to medium. 5% Claystone, carbonaceous and coaly, as above. 3% Coal.
M-7726	3668-3677	12.87	65% Sand, as above, angular. 27% Claystone, variably carbonaceous and coaly as above. 3% Coal. 5% Claystone (light) brown-grey. Obs. Pyrite; ?Sphaerosiderite; red-brown. Claystone.
M-7728	3686-3695	5.98 56.93	75% Claystone, dark grey to black and carbonaceous/coaly, (dark) grey-brown. 20% Coal. 5% Sand/Sandstone.
M-7730	3704-3713	22.73	70% Claystone, dark (brownish) grey to grey-black carbonaceous/coaly, (dark) grey-brown (interlaminated with Coal). 30% Coal. Sm.am. Sand/Sandstone.
M-7732	3722-3731	8.60	80% Claystone, dark grey, variably carbonaceous, (dark) grey-brown. 15% Sandstone. 5% Coal.
M-7734	3740-3749	6.21 1.12	45% Claystone, dark grey to grey-black, variably carbonaceous. 35% Claystone, dark grey-brown to grey-brown, partly coaly. 20% Sand/Sandstone.
M-7736	3758-3767	3.23	85% Sand and Sandstone, white, medium. 15% Claystone, dark partly carbonaceous, (dark) grey-brown. Sm.am. Siderite.

Lithology and Total Organic Carbon measurements

TABLE NO.: II
WELL NO.: 6407/2-1

Sample	Depth (m)	TOC	Lithology
M-7738	3776-3785	1.92	60% Sand/Sandstone, medium-coarse. 40% Claystone, dark grey to brownish and occ. grey-black. Sm.am. Coal.
M-7740	3794-3803	2.24	70% Claystone, dark grey to brownish and grey-black. 30% Sandstone, white, fine-medium. Sm.am. Limestone, white.
M-7742	3811-3820	1.99	60% Claystone, as above. 40% Sandstone, as above. Sm.am. Claystone, red-brown.
M-7744	3829-3838	0.20 2.17	75% Claystone, light grey, greenish and brownish, some yellow and red-brown. 25% Dark and brownish Claystone, as above. Sm.am. Coal.
M-7746	3847-3856	0.29	100% Claystone, red-brown, light grey to greenish, some yellow. Sm.am. dark Claystone and Coal; Limestone, white.
M-7748	3865-3870	0.17	100% Claystone, as above. Sm.am. dark Claystone and Coal.

T A B L E : III

CONCENTRATION OF EOM AND CHROMATOGRAPHIC FRACTIONS

IKU-No	DEPTH (m)	Rock Extr. (g)	EOM (mg)	Sat. (mg)	Aro. (mg)	HC (mg)	Non HC (mg)	TOC (%)
M 7414	2680.00	23.9	4.9	1.3	0.9	2.2	2.7	1.02
M 7416	2698.00	25.7	2.1	0.7	0.8	1.5	0.6	0.95
M 7422	2752.00	39.5	3.2	1.1	1.9	3.0	0.2	1.61
M 7426	2788.00	51.6	3.3	0.6	0.6	1.2	2.1	1.14
M 7430	2824.00	49.4	4.5	2.6	1.5	4.1	0.4	1.34
M 7432	2842.00	45.2	4.3	1.8	2.2	4.0	0.3	1.76
M 7434	2860.00	3.6	15.0	2.4	4.1	6.5	8.5	7.30
M 7436	2878.00	22.4	162.8	11.1	31.1	42.2	120.6	8.75
M 7438	2896.00	45.6	362.4	17.8	62.5	80.3	282.1	8.64
M 7440	2914.00	51.2	371.0	44.5	64.5	109.0	262.0	8.65
M 7442	2932.00	14.6	372.8	16.0	14.8	30.8	342.0	8.27
M 7661	3094.00	24.4	42.8	15.5	11.5	27.0	15.8	2.31
M 7665	3130.00	24.2	13.0	2.8	2.4	5.2	7.8	1.83
M 7669	3166.00	9.5	5.6	1.4	0.8	2.2	3.4	1.65
M 7694	3391.00	14.5	200.9	20.8	13.7	34.5	166.4	50.53
M 7704	3481.00	26.1	246.7	38.5	26.6	65.1	181.6	54.08
M 7716	3587.00	35.8	88.8	33.9	19.3	53.2	35.6	12.82
M 7728	3695.00	46.9	57.7	0.8	4.4	5.2	52.5	6.31

DATE : 23 - 11 - 82.

T A B L E : IV

WEIGHT OF EOM AND CHROMATOGRAPHIC FRACTIONS

(Weight ppm OF rock)

IKU-No	DEPTH (m)	EOM	Sat.	Aro.	HC	Non HC
M 7414	2680.00	205	54	38	92	113
M 7416	2698.00	82	27	31	58	23
M 7422	2752.00	81	28	48	76	5
M 7426	2788.00	64	12	12	23	41
M 7430	2824.00	91	53	30	83	8
M 7432	2842.00	95	40	49	88	7
M 7434	2860.00	4167	667	1139	1806	2361
M 7436	2878.00	7268	496	1388	1884	5384
M 7438	2896.00	7947	390	1371	1761	6186
M 7440	2914.00	7246	869	1260	2129	5117
M 7442	2932.00	25534	1096	1014	2110	23425
M 7661	3094.00	1754	635	471	1107	648
M 7665	3130.00	537	116	99	215	322
M 7669	3166.00	589	147	84	232	358
M 7694	3391.00	13855	1434	945	2379	11476
M 7704	3481.00	9452	1475	1019	2494	6958
M 7716	3587.00	2480	947	539	1486	994
M 7728	3695.00	1230	17	94	111	1119

DATE : 23 - 11 - 82.

TABLE : V

CONCENTRATION OF EOM AND CHROMATOGRAPHIC FRACTIONS

(mg/g TOC)

IKU-No	DEPTH (m)	EOM	Sat.	Aro.	HC	Non HC
M 7414	2680.00	20.1	5.3	3.7	9.0	11.1
M 7416	2698.00	8.6	2.9	3.3	6.1	2.5
M 7422	2752.00	5.0	1.7	3.0	4.7	0.3
M 7426	2788.00	5.6	1.0	1.0	2.0	3.6
M 7430	2824.00	6.8	3.9	2.3	6.2	0.6
M 7432	2842.00	5.4	2.3	2.8	5.0	0.4
M 7434	2860.00	57.1	9.1	15.6	24.7	32.3
M 7436	2878.00	83.1	5.7	15.9	21.5	61.5
M 7438	2896.00	92.0	4.5	15.9	20.4	71.6
M 7440	2914.00	83.8	10.0	14.6	24.6	59.2
M 7442	2932.00	308.8	13.3	12.3	25.5	283.2
M 7661	3094.00	75.9	27.5	20.4	47.9	28.0
M 7665	3130.00	29.4	6.3	5.4	11.7	17.6
M 7669	3166.00	35.7	8.9	5.1	14.0	21.7
M 7694	3391.00	27.4	2.8	1.9	4.7	22.7
M 7704	3481.00	17.5	2.7	1.9	4.6	12.9
M 7716	3587.00	19.3	7.4	4.2	11.6	7.8
M 7728	3695.00	19.5	0.3	1.5	1.8	17.7

DATE : 23 - 11 - 82.

IKU

T A B L E : VI

COMPOSITION IN % OF MATERIAL EXTRACTED FROM THE ROCK

IKU-No	DEPTH (m)	Sat / EOM	Aro / EOM	HC / EOM	SAT / Aro	Non HC / EOM	HC / Non HC
M 7414	2680.00	26.5	18.4	44.9	144.4	55.1	81.5
M 7416	2698.00	33.3	38.1	71.4	87.5	28.6	250.0
M 7422	2752.00	34.4	59.4	93.8	57.9	6.2	1500.0
M 7426	2788.00	18.2	18.2	36.4	100.0	63.6	57.1
M 7430	2824.00	57.8	33.3	91.1	173.3	8.9	1025.0
M 7432	2842.00	41.9	51.2	93.0	81.8	7.0	1333.3
M 7434	2860.00	16.0	27.3	43.3	58.5	56.7	76.5
M 7436	2878.00	6.8	19.1	25.9	35.7	74.1	35.0
M 7438	2896.00	4.9	17.2	22.2	28.5	77.8	28.5
M 7440	2914.00	12.0	17.4	29.4	69.0	70.6	41.6
M 7442	2932.00	4.3	4.0	8.3	108.1	91.7	9.0
M 7661	3094.00	36.2	26.9	63.1	134.8	36.9	170.9
M 7665	3130.00	21.5	18.5	40.0	116.7	60.0	66.7
M 7669	3166.00	25.0	14.3	39.3	175.0	60.7	64.7
M 7694	3391.00	10.4	6.8	17.2	151.8	82.8	20.7
M 7704	3481.00	15.6	10.8	26.4	144.7	73.6	35.8
M 7716	3587.00	38.2	21.7	59.9	175.6	40.1	149.4
M 7728	3695.00	1.4	7.6	9.0	18.2	91.0	9.9

DATE : 23 - 11 - 82.

T A B L E VII

TABULATION OF DATAS FROM THE GASCHROMATOGRAMS

IKU No.	DEPTH (m)	PRISTANE / n-C17	PRISTANE / PHYTANE	CPI
M 7414	2680	0.7	1.9	3.1
M 7416	2698	0.7	1.7	1.7
M 7422	2752	0.4	1.5	1.4
M 7426	2788	0.5	1.5	1.4
M 7430	2824	0.6	1.4	1.4
M 7432	2842	1.8	3.9	1.6
M 7434	2860	2.6	1.1	1.1
M 7436	2878	2.5	0.9	1.3
M 7438	2896	1.7	0.8	1.1
M 7440	2914	1.8	1.0	1.4
M 7442	2932	1.8	0.9	1.4
M 7661	3094	1.1	1.3	1.1
M 7665	3130	1.5	1.4	1.2
M 7669	3166	1.8	1.6	1.5
M 7694	3391	3.5	8.4	1.4
M 7704	3481	3.0	9.2	1.3
M 7716	3587	4.8	7.3	1.4
M 7728	3695	2.7	4.7	1.3

DATE : 23 - 11 - 82.

IKU

Visual Kerogen Analysis

TABLE NO.: VIII
WELL NO.: 6407/2-1

Sample	Depth (m)	Composition of residue	Particle size	Preservation palynomorphs	Thermal maturation index	Remarks
	1530-40 clayst.	Am, Cy/W, P	F-M	fair to good	1 - 1/1+	Dense aggregates of ?amorphous material embedding very fine vitrinite particles and palynomorphs. Pyrite abundant.
	1610 - 20 clayst.	W, P/Am, Cy	F-M	fair to good	1 - 1/1+	Amorphous grannulate matrix adheres to palynomorphs and embeds sapropelised woody fragments (small vitrinite particles as above). Some pyrite.
	1730 - 40 clayst.	W, P, S/Am, Cy	F-M	good	1 - 1/1+	Mostly well dispersed material. Rich and well preserved cyst assemblage. Abundant pyrite. Some semifusinite.
	2230 - 40 clayst.	WR!, W, P/Am, Cy	F-M	good	1 - 1/1+	Resembles the 1730-40m above, but an increase in dark, reworked/oxidised material. (semifusinite/fusinite and inertinite).

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

IKU

Visual Kerogen Analysis

TABLE NO.: VIII
WELL NO.: 6407/2-1

Sample	Depth (m)	Composition of residue	Particle size	Preservation palynomorphs	Thermal maturation index	Remarks
	2310 - 20 clayst.	W, WR!, P/Am, Cy	F-M	good	1 - 1/1+	Resembles samples 1730 - 40m and 2310 - 20m.
	2390 - 400 clayst.	WR!, W, P/Am, Cy	F-M	good	1 - 1/1+	Resembles 2230-40m Cretaceous palynomorphs with pyrite in cavities.
	2470 - 80 clayst.	WR!, W, P/Am, Cy	F-M	good	1 - 1/1+	Increase in reworked black material and semifusinite. Relative increase in cysts compared with pollen and spores.
	2545 - 54 clayst.	W, WR!, P/Am, Cy	F-M	good	1 - 1/1+	As 2470 - 80m.
	2617 - 26 clayst.	W, WR!, P/Am, Cy	F-M	good	1 - 1/1+	As 2470 - 80m, some cysts are thick walled and dark stained.
	2671 - 80 clayst.	W, WR!, P/Am, Cy	F-M	good	1 - 1/1+	As 2617 - 80m.

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

IKU

Visual Kerogen Analysis

TABLE NO.: VIII
WELL NO.: 6407/2-1

Sample	Depth (m)	Composition of residue	Particle size	Preservation palynomorphs	Thermal maturation index	Remarks
	2689 - 98	WR!, W, P, /Am, Cy	F-M(-L)	good	1 - 1/1+	Dark stained cysts. Medium to large sized semifusinite/ fusinite. Coal fragments.
	2707 - 16 clayst.	WR!, W, P/Am, Cy	F-M	good	1 - 1/1+	Coal fragments. Mixture of Cretaceous cysts and some ?reworked spores. Light-coloured bisaccates as above.
	2743 - 52 clayst.	WR!, W, /Am, Cy	F-M	good	1/1+	A smaller residue in relation to those above.
	2779 - 88 clayst.	WR!, W, /Am, Cy	F-M	good to fair	1/1+	
	2815 - 24 clayst.	WR!, W, /Am, Cy	F-M	good	1/1+	Increase in abundance of cysts. Woody fragments with a rather dull, dark colour.
	2833 - 42 clayst.	W, P, S, WR!/Am, Cy	F-M	fair to good	1/1+	Dense pyritic aggregates embedding small vitrinite particles. Occasional grey vitrinite, some semifusinite.

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**

IKU

Visual Kerogen Analysis

TABLE NO.: VIII
WELL NO.: 6407/2-1

Sample	Depth (m)	Composition of residue	Particle size	Preservation palynomorphs	Thermal maturation index	Remarks
	2851 - 60 shale	W, Cut, P, S/Am, Cy	F-M	fair to good	1 - 1/1+	Small rounded aggregates. Tasmanitids, Botryococcus.
	2869 - 78 shale	Cut, W, P/Am, Cy	F-M-L	poor to fair	1 - 1/1+	Pyritic aggregates mostly of structured sapropelised material (cuticles). Tasmanitids, Botryococcus. Distinction between algae and cuticles is difficult.
	2887 - 96 shale	Cut, W, P/Am, Cy	F-M-L	poor to fair	1 - 1/1+	As above.
	2905 - 14 shale	Cut, W, P/Am, Cy	F-M-L	poor to fair	1 - 1/1+	As above.
	2923 - 30 shale	Cy, Am/Cut, W, P	F-M-L	poor	1 - 1/1+	Sapropelised material sticks to particles and obscures them Mostly former structured material. Distinction between algae (Botryococcus?) and cuticles is difficult.

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

Visual Kerogen Analysis

TABLE NO.: VIII
WELL NO.: 6407/2-1

Sample	Depth (m)	Composition of residue	Particle size	Preservation palynomorphs	Thermal maturation index	Remarks
	3085 - 94 clayst.	W, WR!, Cut, P/Am, Cy	F-M	fair to good	1 - 1/1+, 1+/2-	More well dispersed material. Amount of vitrinite/semi-fusinite, inertinite increased. Spores, Botryococcus, -very small ?fungal or algal bodies.
	3121 - 30 clayst.	W, WR!, P, Cut/Am, Cy	F-M	fair to good	1 - 1/1+, 1+/2-	Jurassic/Cretaceous cysts. Dominantly semifusinite/ fusinite stages of wood. Amorphous material sticks to the cyst surfaces.
	3157 - 66 clayst.	Cut, W, WR!, P/Am, Cy	F-M	fair to good	1 - 1/1+, 1+/2-	As above, sapropelised cuticles.
	3382 - 91 carb.	W, P, S/?	F-M	fair	1/1+	Coal fragments. Most palynomorphs are long-ranging Mesozoic forms. Chem. oxidation needed to classify plant material further.
	3472 - 81 clayst.	W, P, S/?	F-M	fair	1/1+, 2-	As 3382 - 91m 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

IKU

Visual Kerogen Analysis

TABLE NO.: VIII
WELL NO.: 6407/2-1

Sample	Depth (m)	Composition of residue	Particle size	Preservation palynomorphs	Thermal maturation index	Remarks
	3578 - 87 clayst.	W, Cut, S, P/?	F-M-L	fair to good	1/1+, 2-	Change in composition, stronger sapropelisation and change in palynoassemblage, Early Jurassic material observed.
	3686 - 95	W, Cut, S, P/Am	F-M-L	good	1/1+, 2-	Limbosporites lundbladii present together with the Early Jurassic material from 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

IKU

Vitrinite Reflectance measurements

TABLE NO.: IX
WELL NO.: 6407/2-1

Sample	Depth (m)	Vitrinite reflectance	Fluorescence in UV light	Exinite content
M-7298	1530 - 1540	0.30 (18)	Nil	Nil
M-7314	1690 - 1700	0.31 (23)	Green spores	Trace
M-7328	1830 - 1840	0.31 (5)	Green spores	Trace
M-7340	1950 - 1969	0.33 (14)	Green spores	Trace
M-7374	2290 - 2300	0.45 (5)	Green/yellow spores	Trace
M-7384	2390 - 2400	N.D.P.	Green yellow spores? algae?	Trace
M-7400	2545 - 2554	0.49 (6)	Green/yellow	Low
M-7420	2725 - 2734	0.33 (1)	Green algae	Trace
M-7436	2869 - 2878	0.30 (16) and 0.50 (4)	Green/yellow spores and algae. Yellow/orange spores	Trace
M-7653	3013 - 3022	0.28 (1) and 0.42 (3)	Green/yellow algae	Trace
M-7669	3157 - 3166	0.32 (2) and 0.55 (3)	Green and green/yellow spores	Low
M-7689	3337 - 3346	0.46 (6)	Green/yellow and yellow spores	Low

IKU

TABLE X

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

IKU No.	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)
M 7418	2716	0.24	0.10	0.93	1.10	9	84	0.34	0.71	442
M 7420	2734	0.46	4.09	0.74	1.54	266	48	4.55	0.10	442
M 7422	2752	0.22	0.13	0.56	1.45	9	39	0.35	0.63	423
M 7424	2770	0.11	0.03	0.51	1.26	2	40	0.14	0.79	440
M 7426	2788	0.09	0.02	0.39	1.09	2	36	0.11	0.82	381
M 7428	2806	0.09	0.01	0.45	0.99	1	45	0.10	0.90	300
M 7430	2824	0.14	0.13	0.37	1.44	9	26	0.27	0.52	409
M 7432	2842	0.18	0.18	0.45	1.70	11	26	0.36	0.50	429
M 7433	2851	0.14	2.71	0.41	3.80	71	11	2.85	0.05	432
		Clst								
M 7434	2860	4.04	54.42	0.73	8.97	607	8	58.46	0.07	414
		Sh								
M 7439	2869	7.76	39.49	0.40	9.65	409	4	47.25	0.16	420
		Sh								
M 7436	2878	3.81	47.94	1.04	8.70	551	12	51.75	0.07	422
		Sh								
M 7438	2896	4.50	49.15	0.88	8.59	572	10	53.65	0.08	426
		Sh								
M 7440	2914	3.27	34.07	0.91	7.15	477	13	37.34	0.09	421
		Sh								
M 7441	2923	3.93	41.03	0.35	8.58	478	4	44.96	0.09	422
		Sh								
M 7442	2932	4.28	40.27	1.20	7.68	524	15	44.55	0.10	428
		Sh								
M 7443	2941	5.39	39.72	0.36	8.53	466	4	45.11	0.12	419
		Sh								
M 7659	3076	0.31	0.74	0.81	1.92	39	42	1.05	0.30	430
M 7661	3094	1.02	5.01	0.63	2.41	208	26	6.03	0.17	427
M 7663	3112	0.14	0.31	0.76	1.23	25	62	0.45	0.31	427
M 7665	3130	0.23	0.61	0.72	1.39	44	52	0.84	0.27	428
M 7668	3157	0.22	0.55	0.52	1.33	41	39	0.77	0.29	424
M 7669	3166	0.31	1.89	0.68	1.95	97	35	2.20	0.14	431

DATE : 17 - 11 - 82.

IKU

TABLE X

ROCK EVAL PYROLYSES

IKU No.	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)
M 7298	1540	0.70	2.42	1.45	2.49	97	58	3.12	0.22	420
M 7300	1560	0.49	0.96	1.14	1.66	58	69	1.45	0.34	424
M 7306	1620	0.72	2.66	1.92	2.52	106	76	3.38	0.21	414
M 7310	1660	0.86	1.85	1.81	2.21	84	82	2.71	0.32	405
M 7314	1700	0.58	1.79	1.57	2.11	85	74	2.37	0.24	414
M 7318	1740	0.45	0.46	0.94	1.24	37	76	0.91	0.49	401
M 7322	1780	0.42	0.53	0.97	1.34	40	72	0.95	0.44	406
M 7326	1820	0.43	0.34	1.30	1.23	28	106	0.77	0.56	410
M 7330	1860	0.59	0.38	1.65	1.25	30	132	0.97	0.61	407
M 7368	2240	0.15	0.20	0.71	0.82	24	87	0.35	0.43	421
M 7372	2280	0.27	0.50	0.79	1.01	49	78	0.77	0.36	429
M 7376	2320	0.23	0.36	0.72	1.00	36	72	0.59	0.39	429
M 7380	2360	0.21	0.30	0.59	1.13	27	52	0.51	0.41	429
M 7384	2400	0.12	0.30	0.57	1.02	29	56	0.42	0.29	430
M 7388	2440	0.15	0.23	0.46	0.88	26	52	0.38	0.39	426
M 7392	2480	0.16	0.27	0.60	0.94	29	64	0.43	0.37	424
M 7396	2518	0.38	0.40	0.71	0.98	41	72	0.78	0.49	430
M 7400	2554	0.18	0.26	0.53	1.02	25	52	0.44	0.41	430
M 7404	2590	0.15	0.17	0.56	0.92	18	61	0.32	0.47	391
M 7408	2626	0.17	0.19	0.60	1.06	18	57	0.36	0.47	426
M 7412	2662	0.13	0.06	0.45	0.76	8	59	0.19	0.68	405
M 7414	2680	0.98	2.32	1.54	2.28	82	54	3.30	0.30	439
M 7416	2698	0.18	0.09	0.63	0.83	10	75	0.27	0.69	433

DATE : 17 - 11 - 82.

IKU

TABLE X

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

IKU No.	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)
M 7694	3391 Sh	5.03	72.09	1.25	16.06	449	8	77.12	0.07	429
M 7704	3481 Sh	7.57	133.65	2.35	37.67	355	6	141.22	0.05	440
M 7716	3587 Sh	3.08	51.41	1.41	15.86	324	9	54.49	0.06	438
M 7728	3695 Sh	0.85	15.40	0.98	9.27	166	11	16.25	0.05	438

DATE : 17 - 11 - 82.

Table XI Molecular parameters from triterpane distribution (m/e 191)

IKU no.	Depth (m)	Lith	Zone	C_{28}/C_{30}-αβ[1]	C_{29}/C_{30}-αβ[2]	αβ/αβ+βα[3]	%22S[4]
M-7436	2878	sh		0.77	0.45	0.90	66
M-7438	2896	sh		0.78	0.38	0.91	60
M-7440	2914	sh		1.23	0.60	0.88	56
M-7694	3391	clst		-	0.97	0.73	55
M-7704	3481	clst		-	1.29	0.76	55
M-7716	3587	clst		-	1.33	0.76	54
M-7728	3695	clst		-	0.79	0.81	59

1) C_{28} - compound/17α(H), 21β(H) - hopane (Z/E)
2) 17α(H), 21β(H) - norhopane/17α(H), 21β(H) - hopane
3) 17α(H), 21β(H) - homohopane/17α(H), 21β(H) - + 17β(H), 21α(H) -homohopane
4) %22S in 17α(H), 21β(H) - homohopane (G/G+H)

Table XII Molecular parameters from sterane distribution (m/e 217)

IKU no.	Depth (m)	Lith.	Zone	%20S[1]	%ββ[2]
M-7436	2878	sh		60	44
M-7438	2896	sh		55	46
M-7440	2914	sh		55	40
M-7694	3391	clst		47	40
M-7704	3481	clst		47	36
M-7716	3587	clst		52	35
M-7728	3695	clst		51	39

1) % 20S in 14α(H), 17α(H) - C_{29} - steranes (q/q+t)
2) % 14β(H), 17β(H) - C_{29} - steranes (r+s/q+r+s+t).

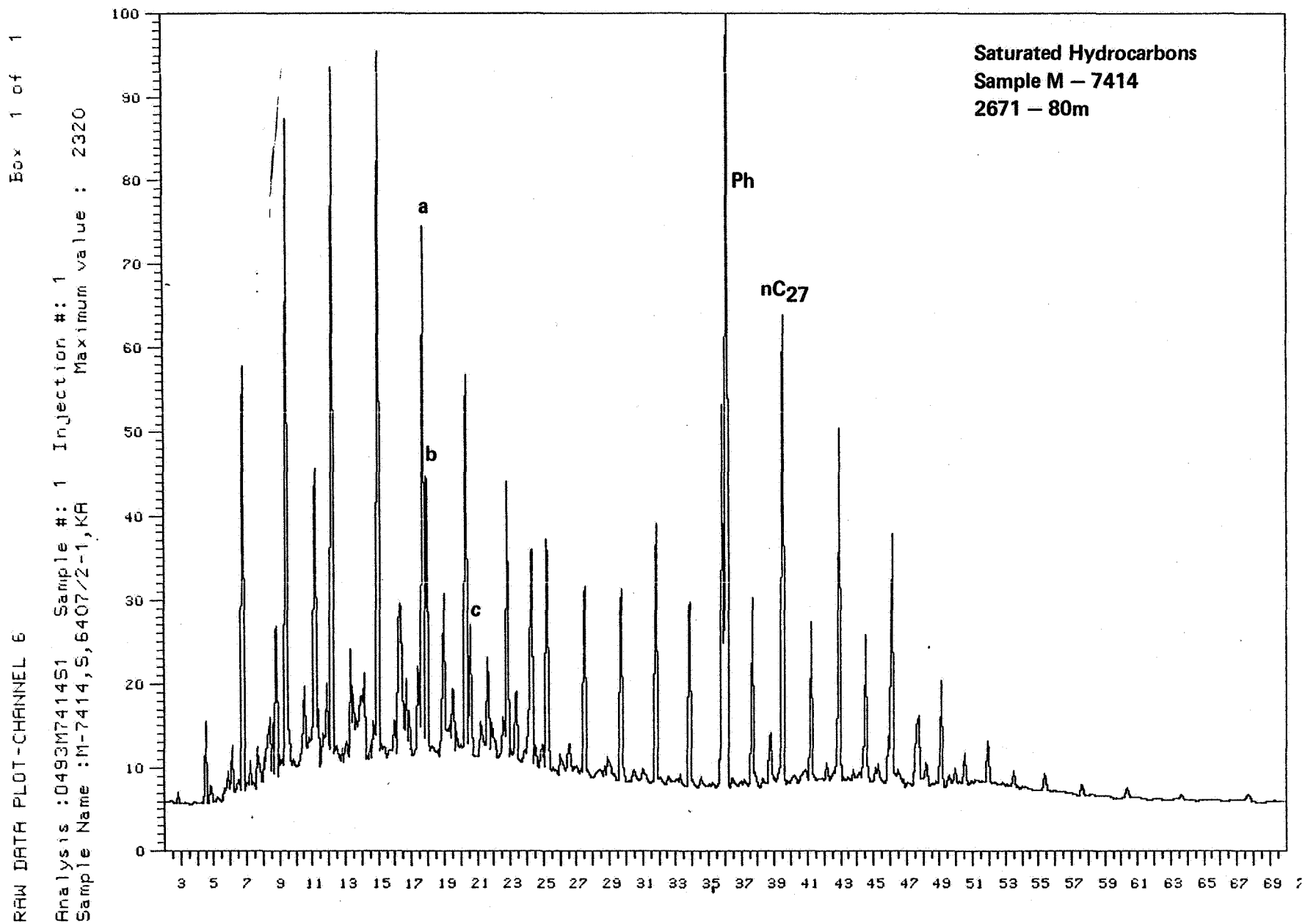
Table XIII Molecular parameter from triaromatic sterane distribution (m/e 231).

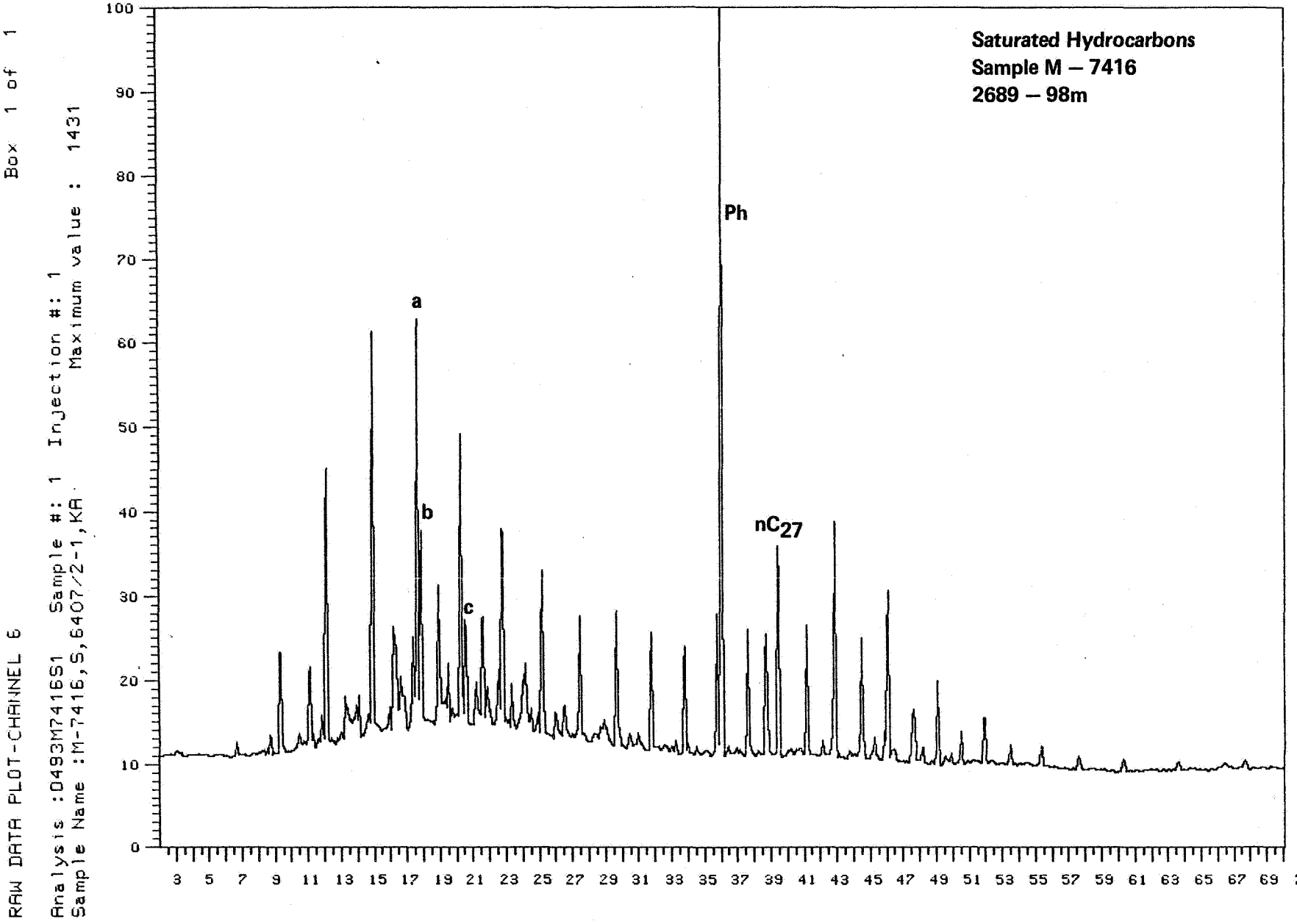
IKU no.	Depth (m)	Lith	Zone	% side chain cracking[1)]
M-7436	2878	sh		0.17
M-7438	2896	sh		0.10
M-7440	2914	sh		0.14
M-7695	3391	clst		0.48
M-7704	3481	clst		0.61
M-7716	3587	clst		0.64
M-7728	3695	clst		0.25

1) % C_{20} - triaromatic/C_{20} - triaromatic + C_{27} - triaromatic (M/M+P).

SATURATED HYDROCARBON GAS CHROMATOGRAMS

a = nC_{17}
b = Pristane
c = Phytane
Ph = Phthalate contaminant

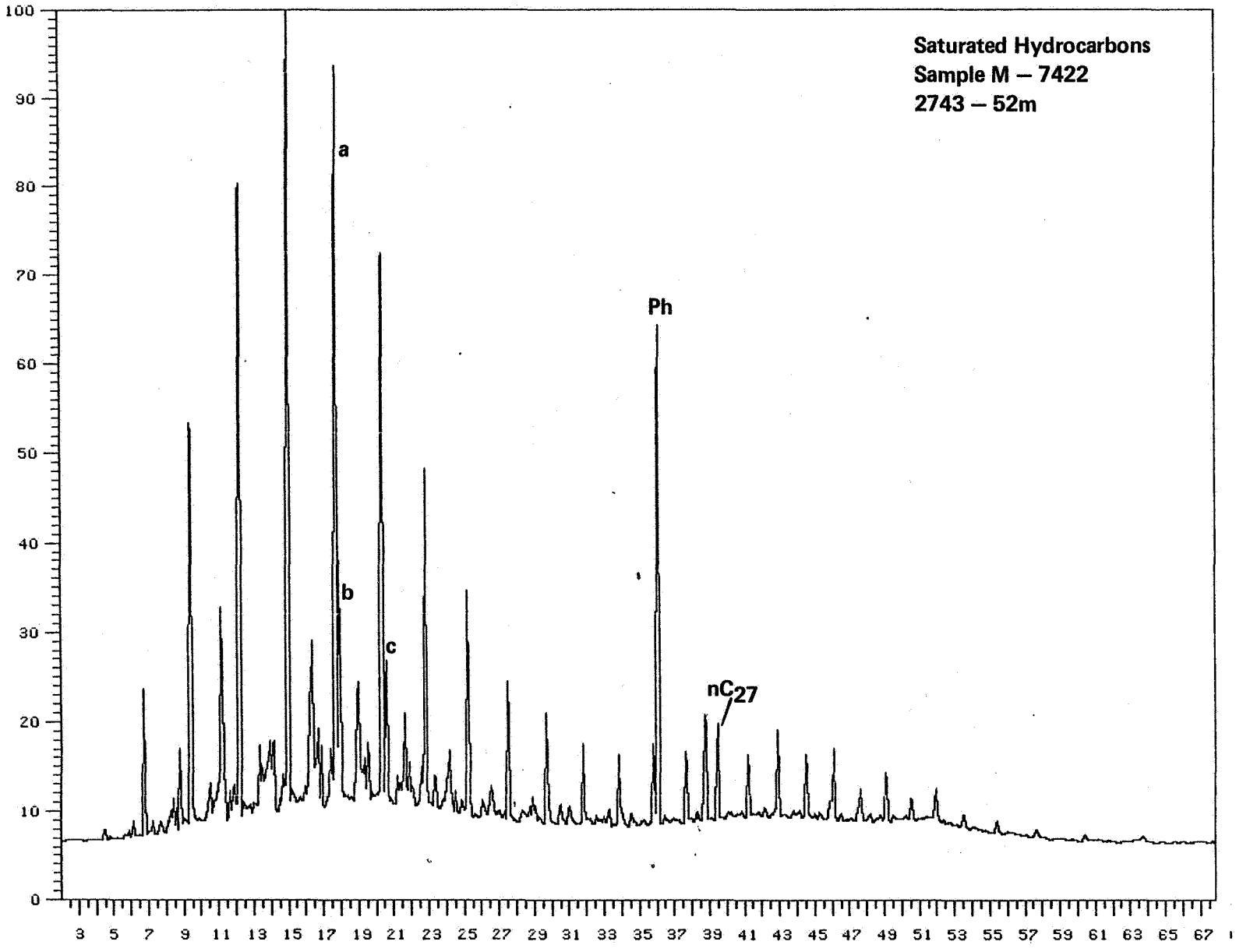

Box 1 of 1
RAW DATA PLOT-CHANNEL 6
Analysis :0493M741451 Sample #: 1 Injection #: 1
Sample Name :M-7414,S,6407/2-1,KA Maximum value : 2320
Saturated Hydrocarbons
Sample M – 7414
2671 – 80m
Ph
a
b
c
nC27

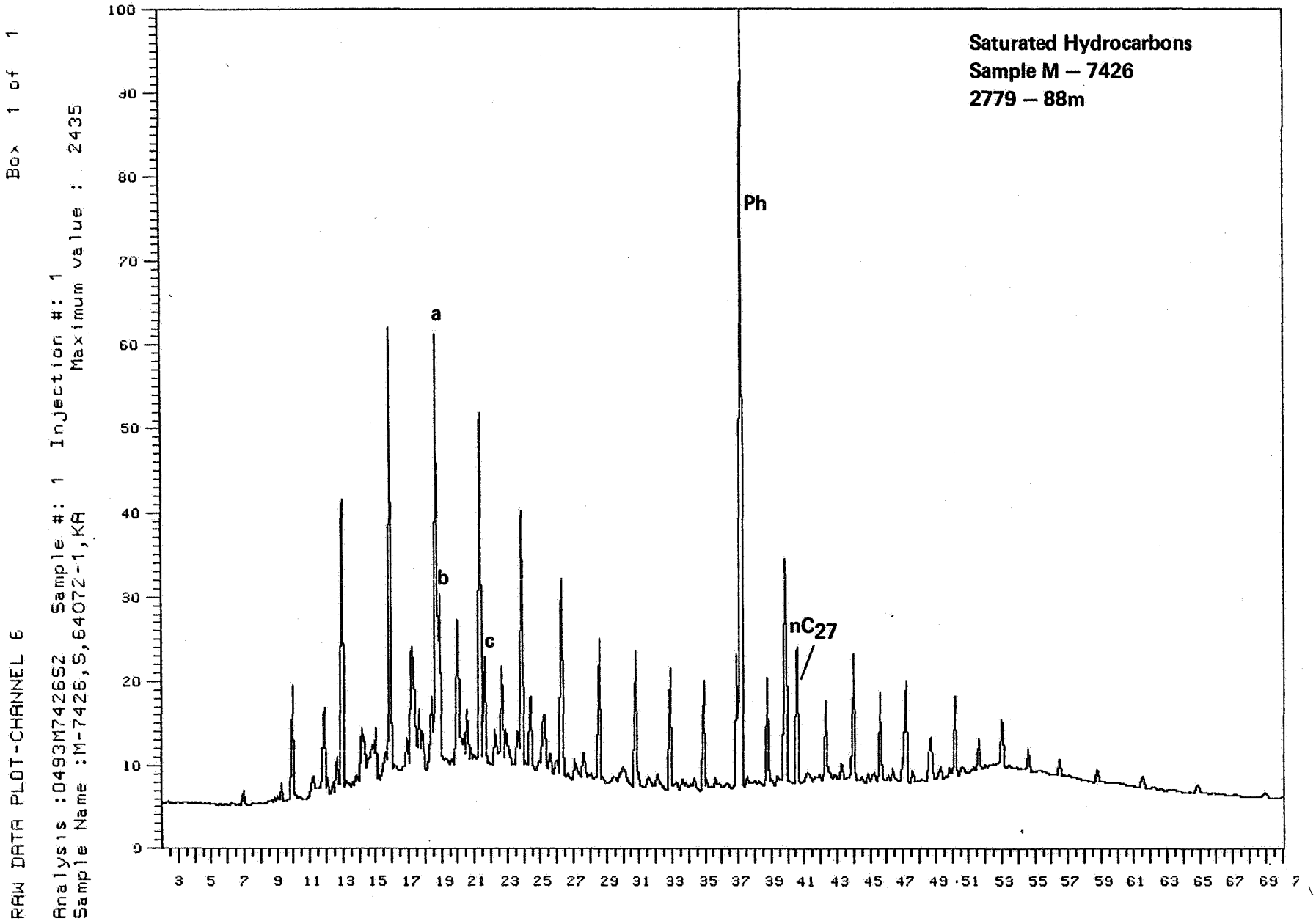

RAW DATA PLOT-CHANNEL 6
Box 1 of 1
Analysis :0493M7416S1 Sample #: 1 Injection #: 1
Sample Name :M-7416,S,6407/2-1,KA Maximum value : 1431
Saturated Hydrocarbons
Sample M – 7416
2689 – 98m
Ph
a
b
c
nC27
100
90
80
70
60
50
40
30
20
10
0
3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51 53 55 57 59 61 63 65 67 69

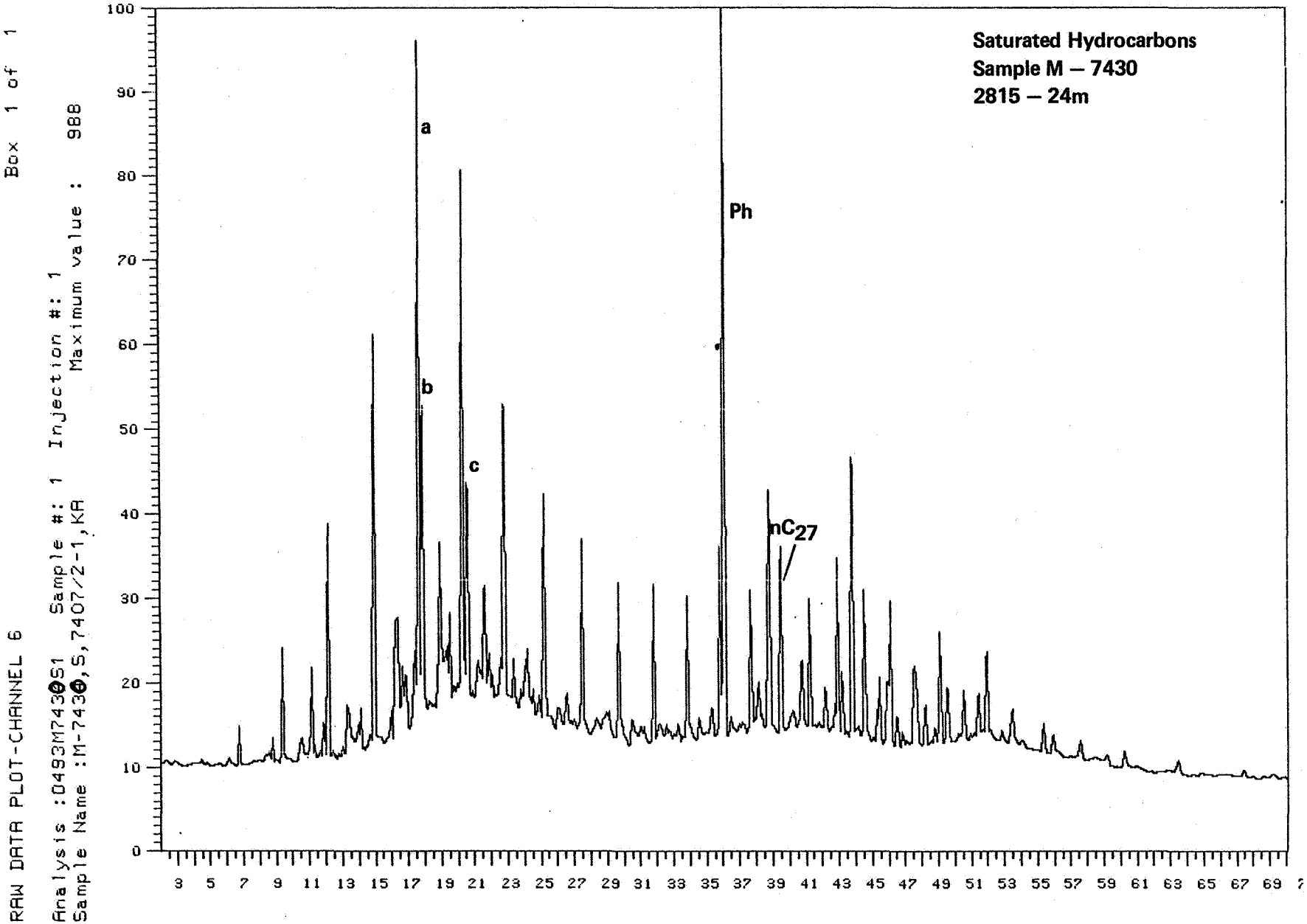
RAW DATA PLOT-CHANNEL 6

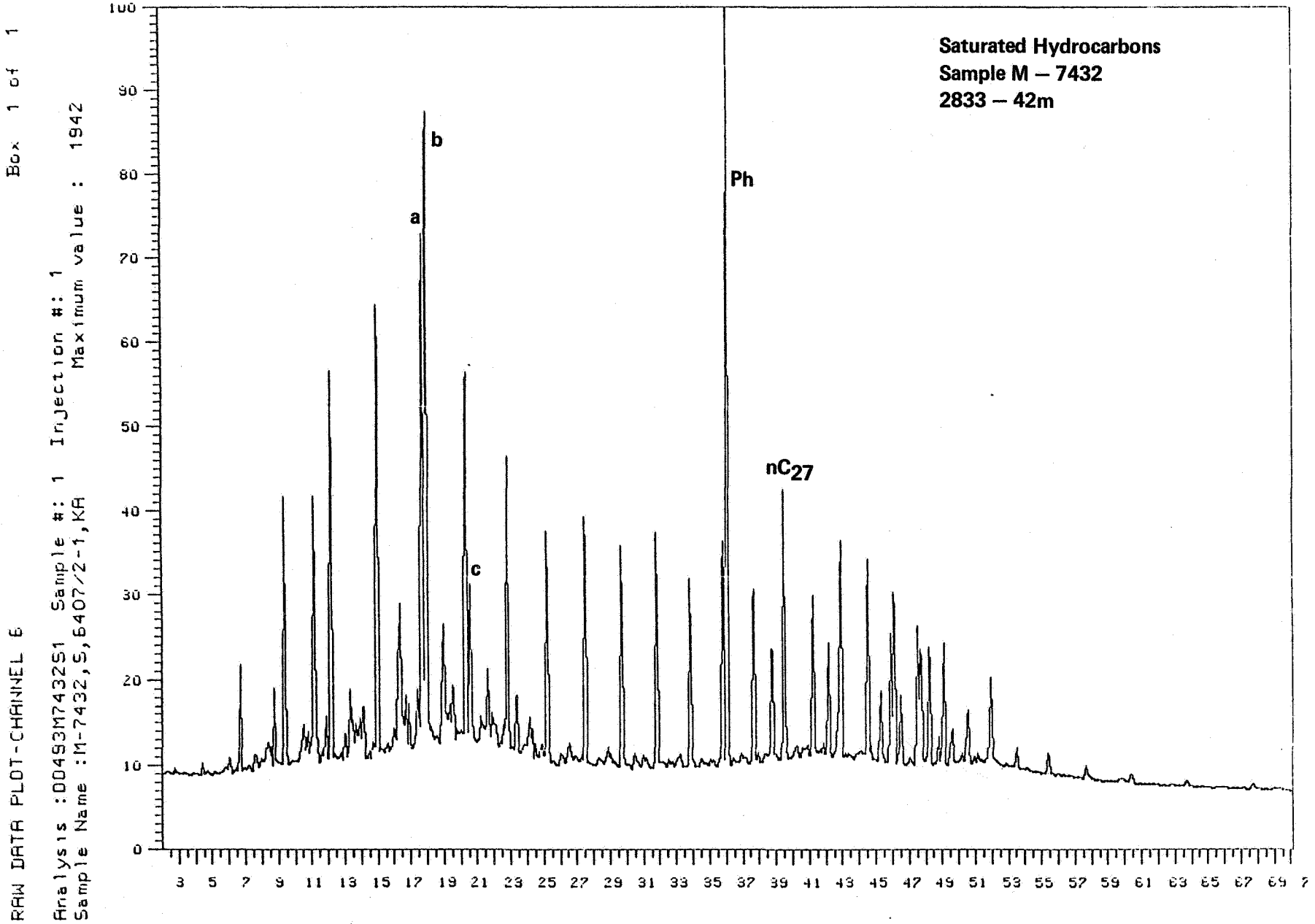
Box 1 of 1

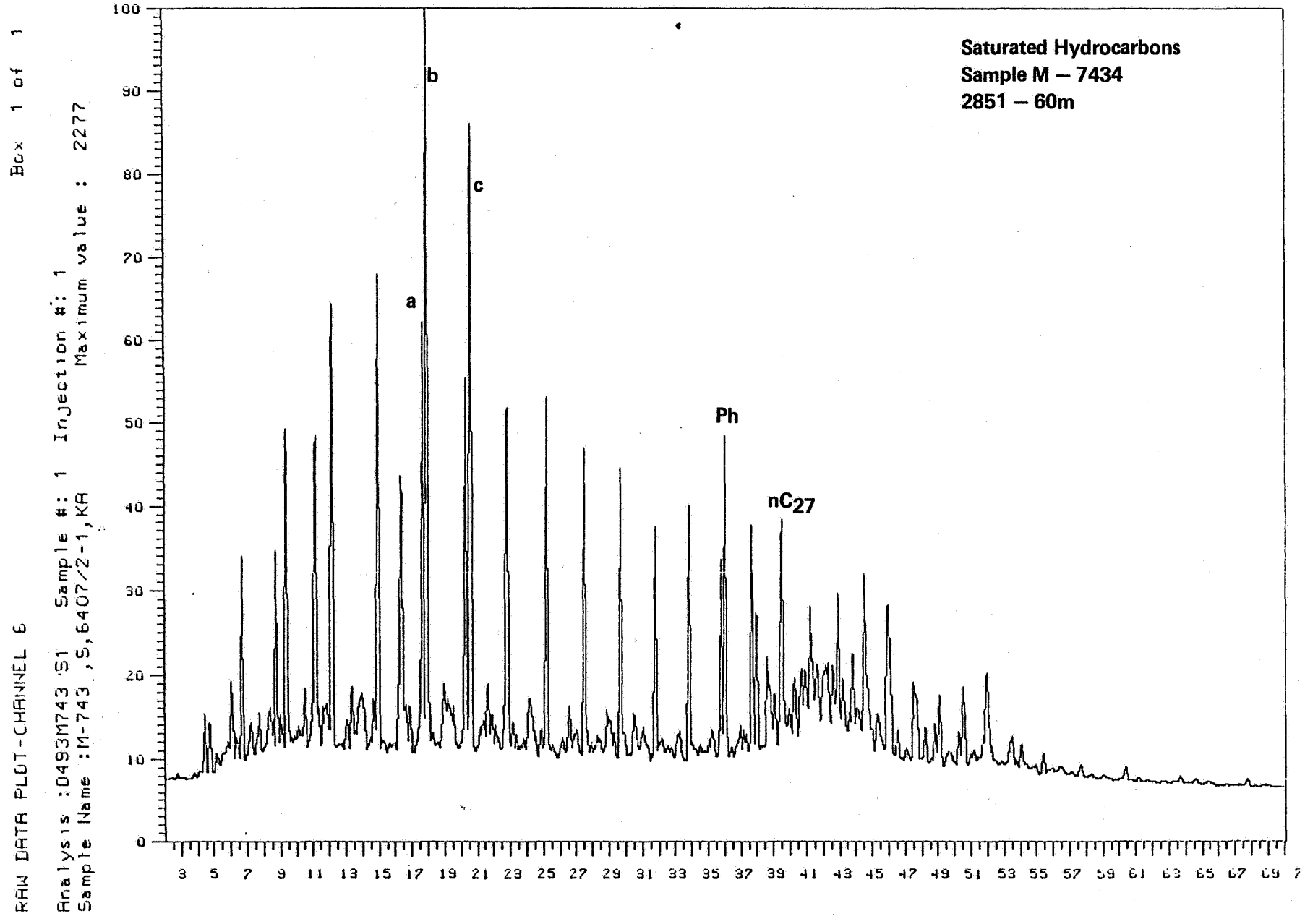
Analysis :0493M7422S1 Sample #: 1 Injection #: 1
Sample Name :M-7422,S,6407/2-1,KA Maximum value : 2444.

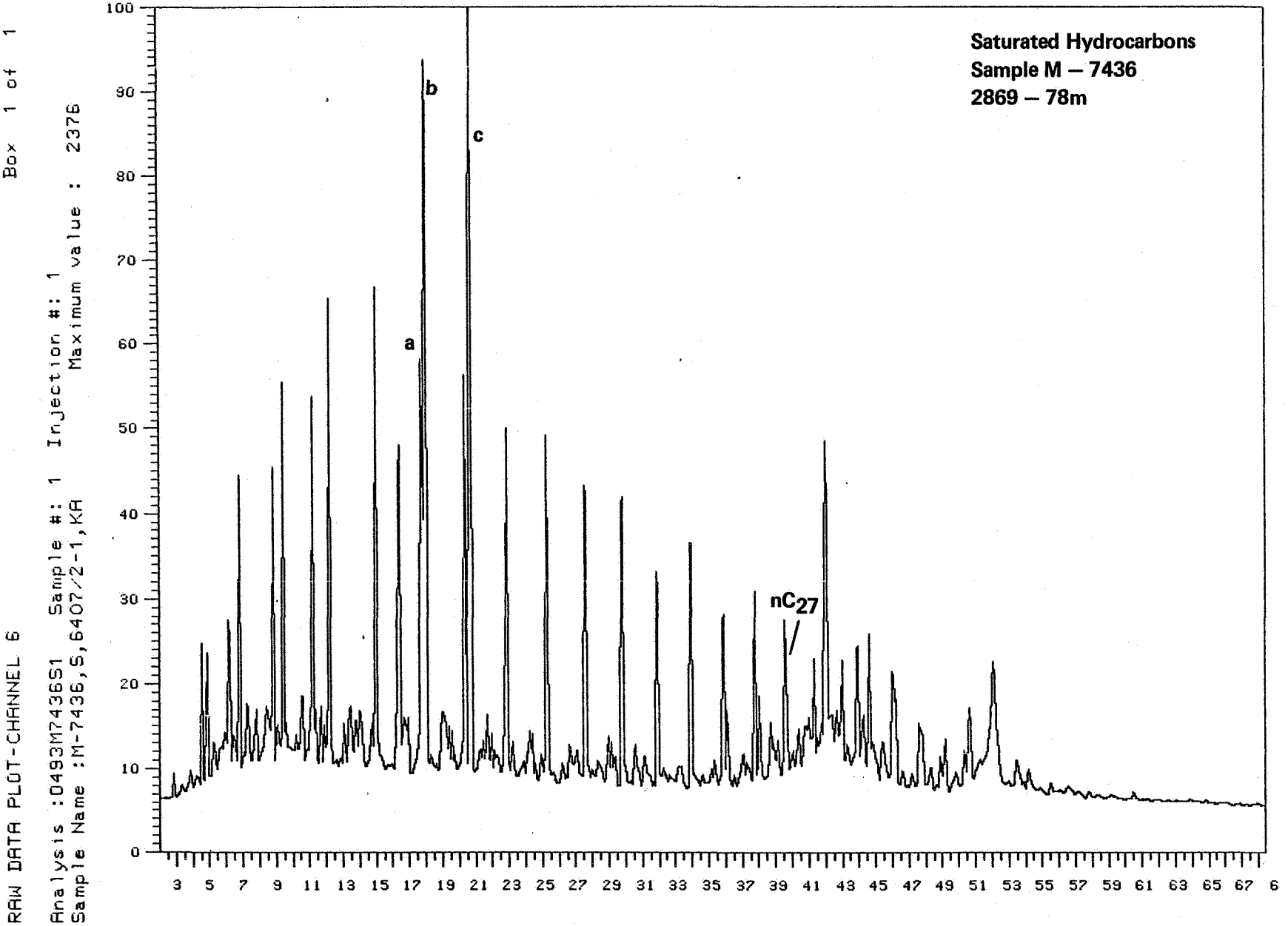



Box 1 of 1
RAW DATA PLOT-CHANNEL 6
Analysis :0493M742652 Sample #: 1 Injection #: 1
Sample Name :M-7426,S,64072-1,KA Maximum value : 2435
Saturated Hydrocarbons
Sample M – 7426
2779 – 88m
Ph
a
b
c
nC27
100
90
80
70
60
50
40
30
20
10
0
3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51 53 55 57 59 61 63 65 67 69


RAW DATA PLOT-CHANNEL 6
Box 1 of 1
Analysis :0493M7430S1 Sample #: 1 Injection #: 1
Sample Name :M-7430,S,7407/2-1,KA Maximum value : 988
Saturated Hydrocarbons
Sample M – 7430
2815 – 24m
a
b
c
Ph
nC27

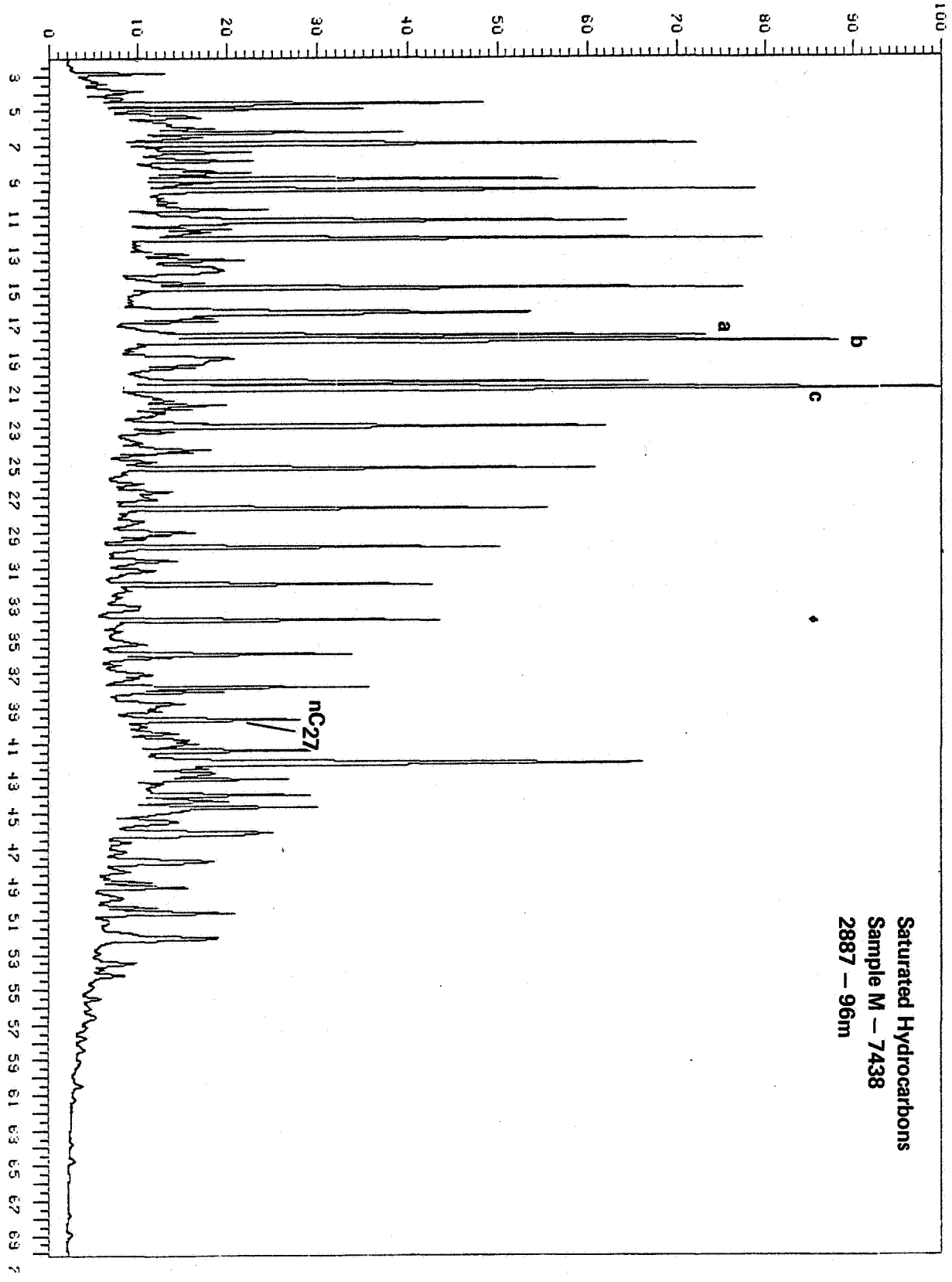

Box 1 of 1
RAW DATA PLOT-CHANNEL 6
Analysis :00493M743251 Sample #: 1 Injection #: 1
Sample Name :M-7432,S,6407/2-1,KA Maximum value : 1942
Saturated Hydrocarbons
Sample M – 7432
2833 – 42m
a
b
c
Ph
nC27


Box 1 of 1
RAW DATA PLOT-CHANNEL 6
Analysis :0493M743 S1 Sample #: 1 Injection #: 1
Sample Name :M-743 ,S,6407/2-1,KA Maximum value : 2277
Saturated Hydrocarbons
Sample M – 7434
2851 – 60m
a
b
c
Ph
nC27
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 7


Box 1 of 1
RAW DATA PLOT-CHANNEL 6
Analysis :0493M7436S1 Sample #: 1 Injection #: 1
Sample Name :M-7436,S,6407/2-1,KA Maximum value : 2376
Saturated Hydrocarbons
Sample M – 7436
2869 – 78m
a
b
c
nC27
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

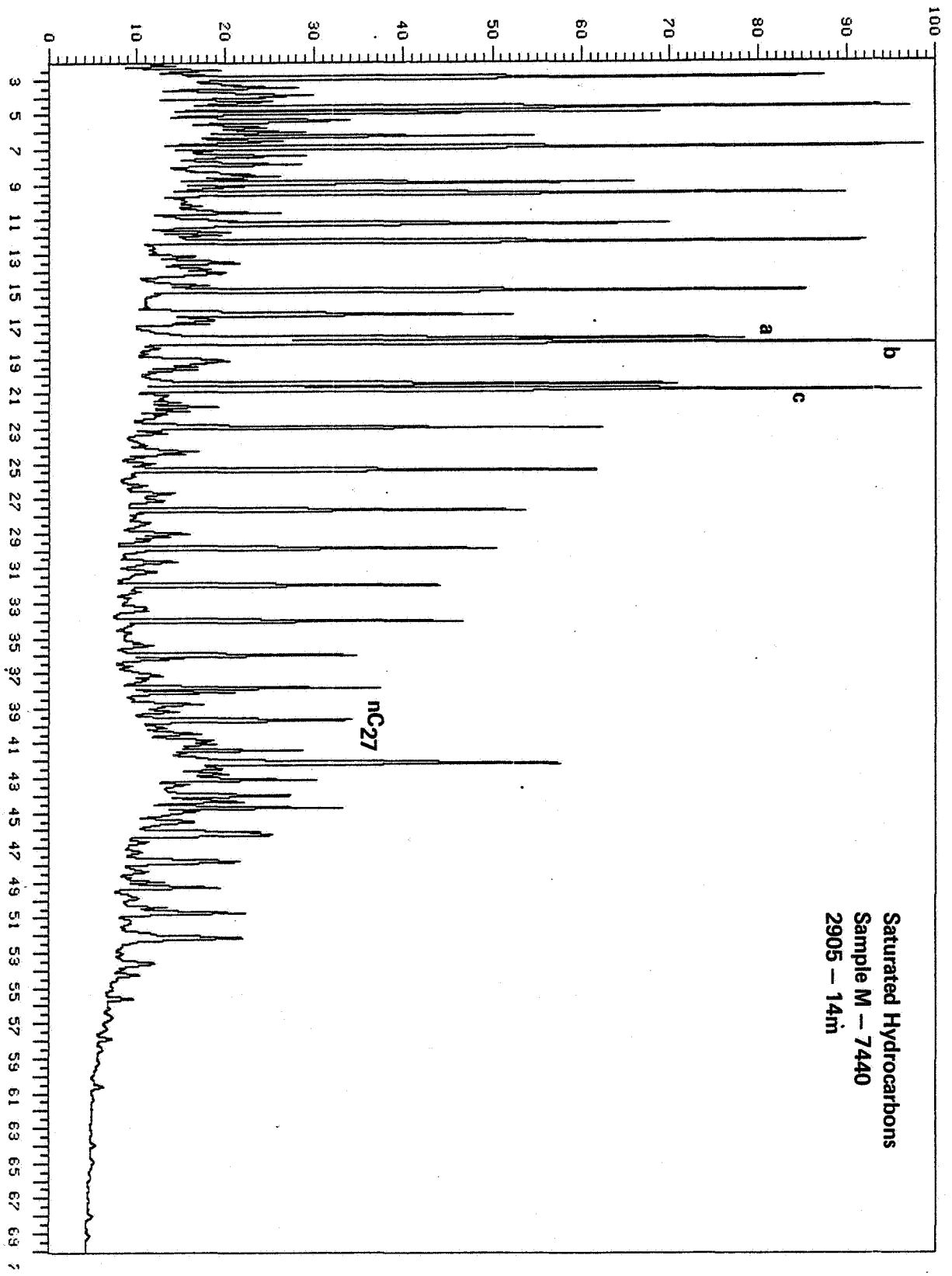
RAW DATA PLOT-CHANNEL B

Analysis :D493SAGAS2 Sample #: 2 Injection #: 1
Sample Name :M-7438,S,6407/2-1 Maximum value : 8890



RAW DATA PLOT-CHANNEL 6 Box 1 of 1

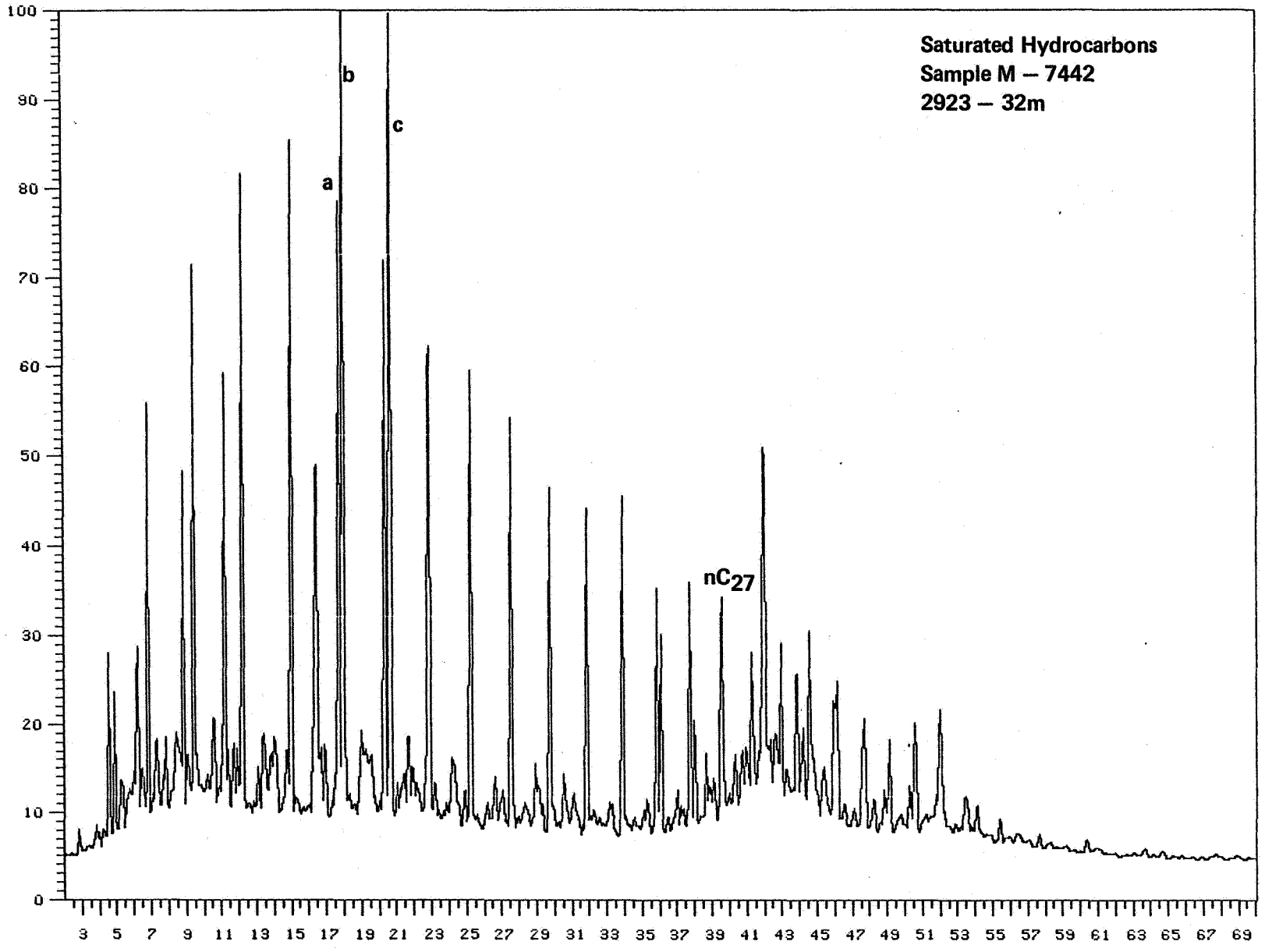
Analysis :0493SAGAS1 Sample #: 1 Injection #: 1
Sample Name :M-7440,S,6407/2-1,KA Maximum value : 3402

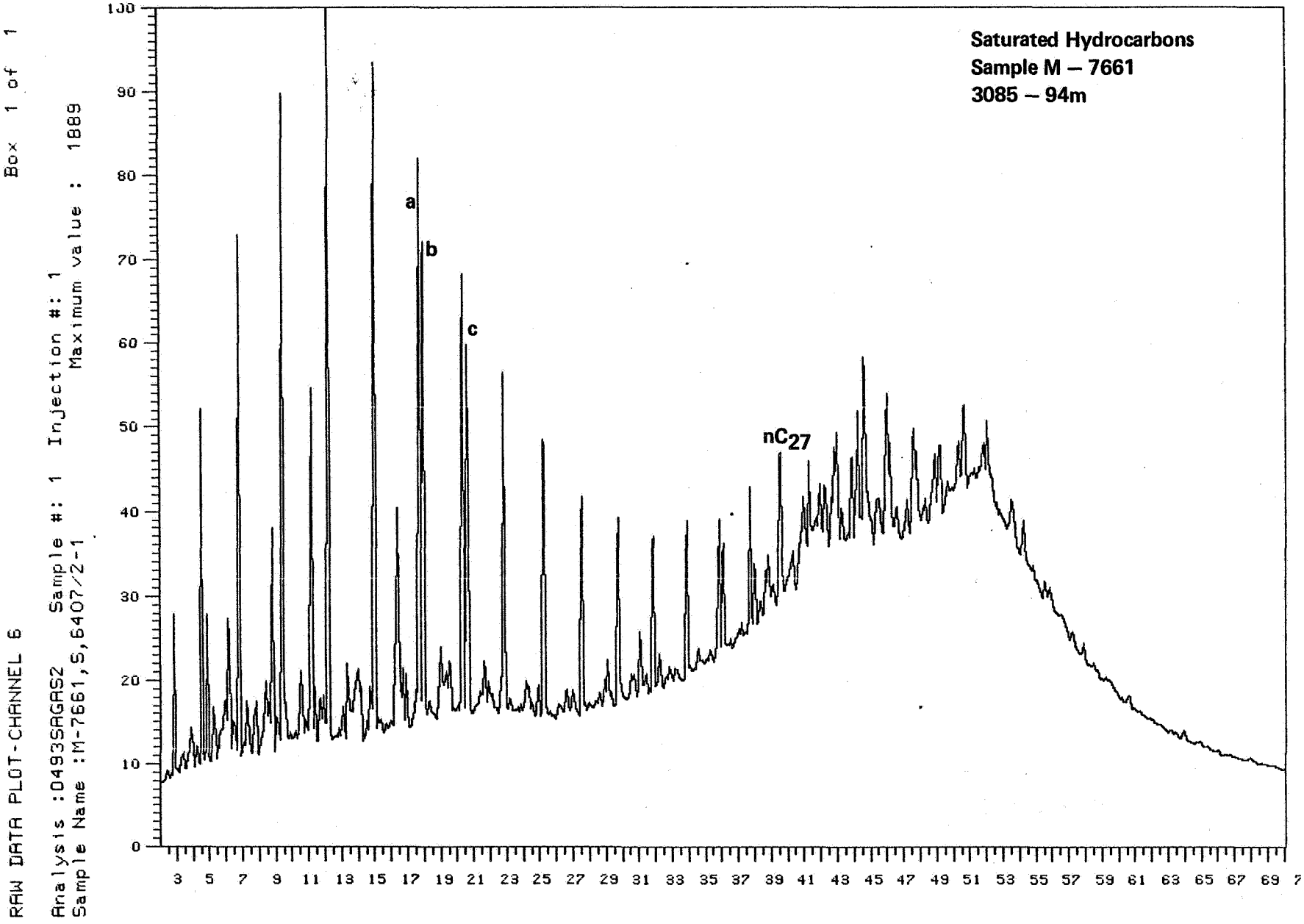


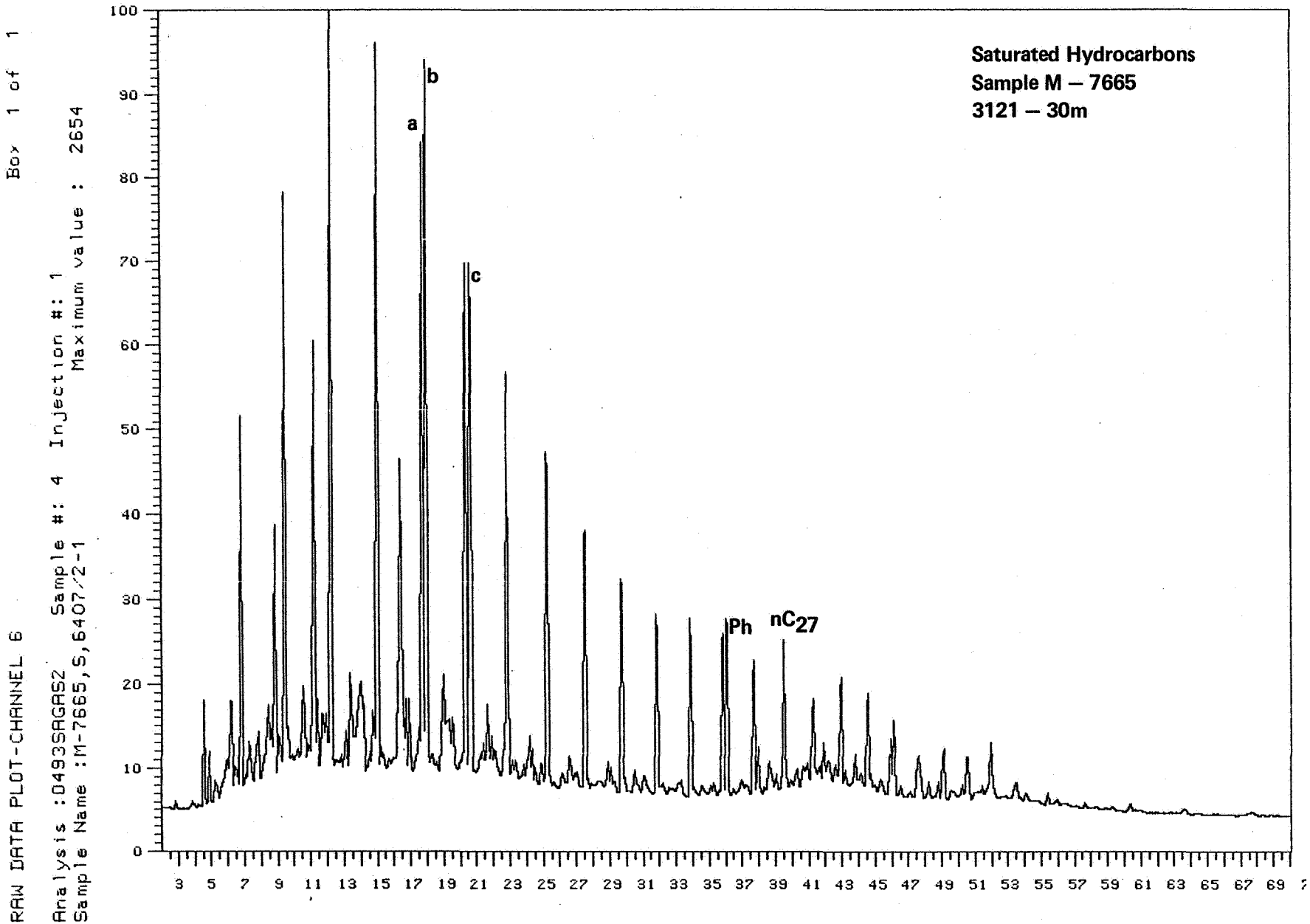
RAW DATA PLOT-CHANNEL 6

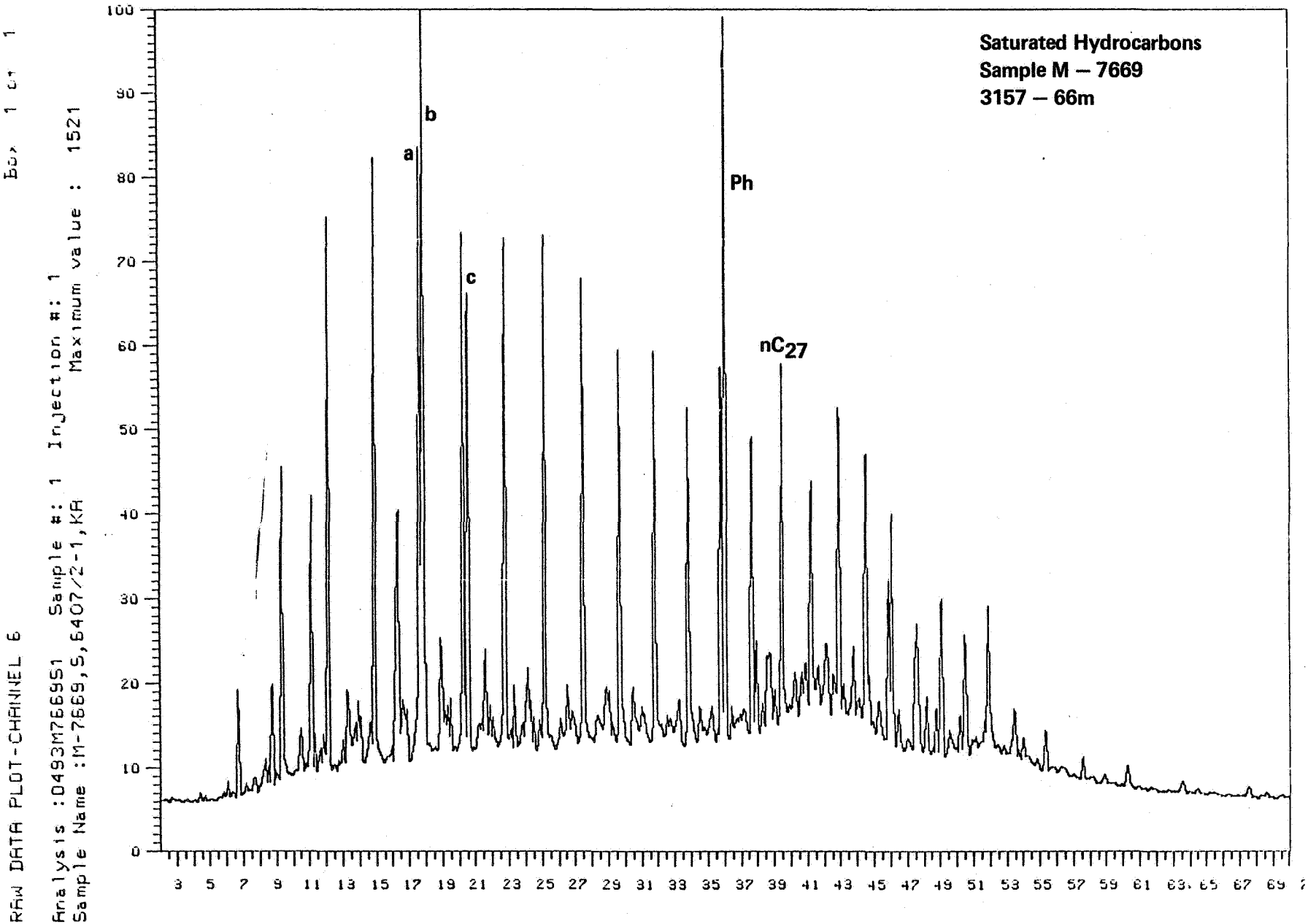
Box 1 of 1

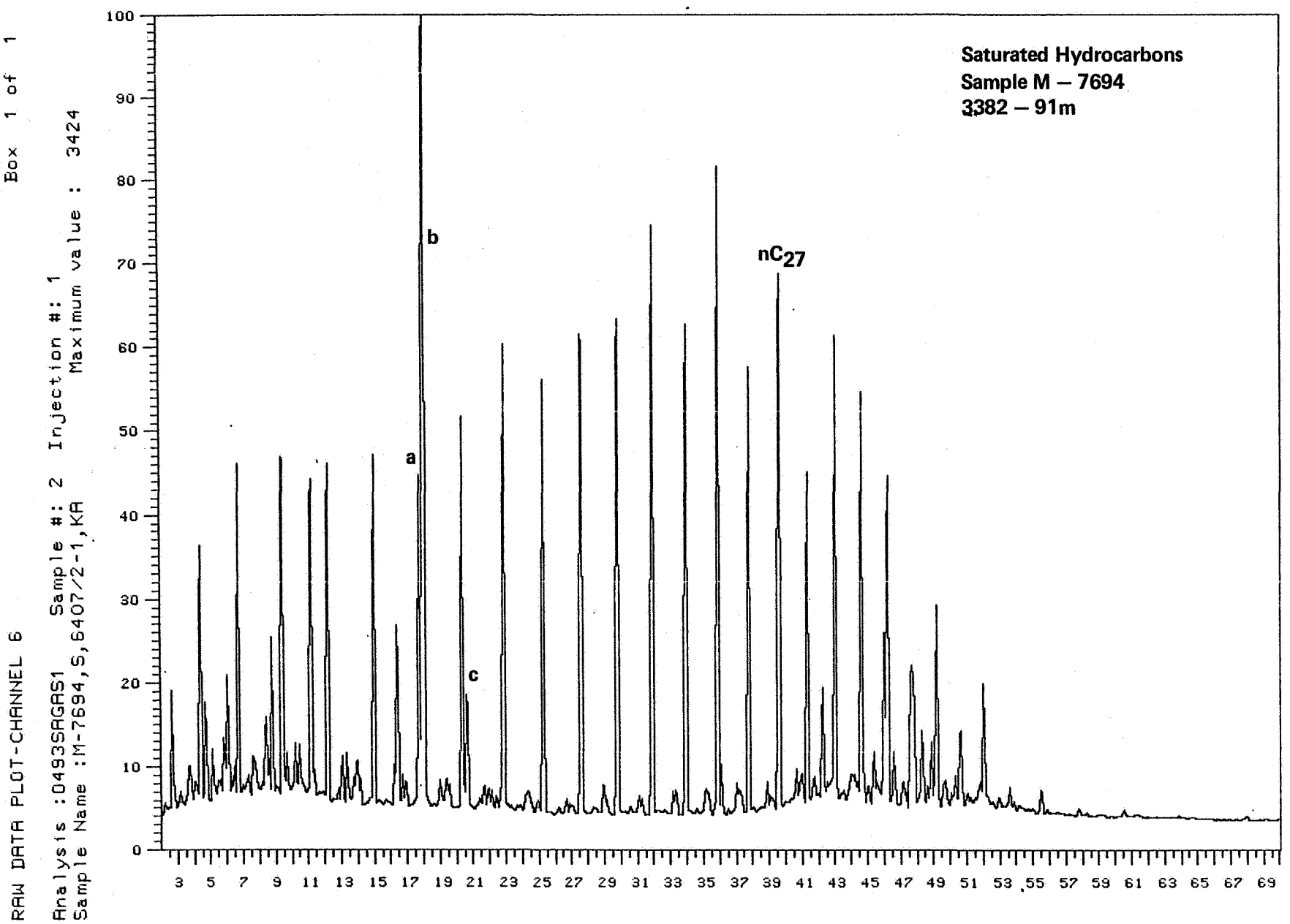
Analysis :0493SAGAS2 Sample #: 3 Injection #: 1
Sample Name :M-7442,S,6407/2-1 Maximum value : 2630

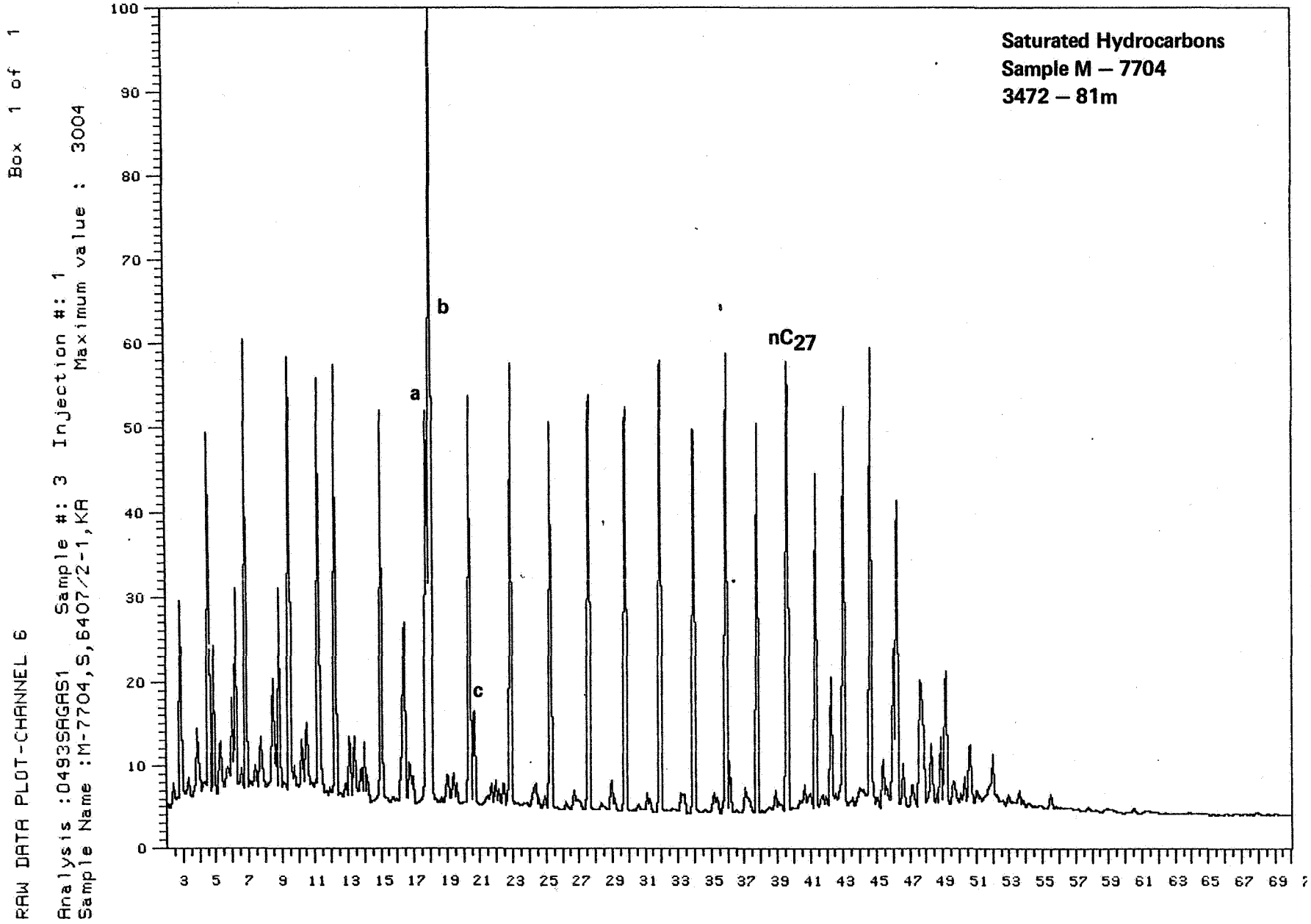


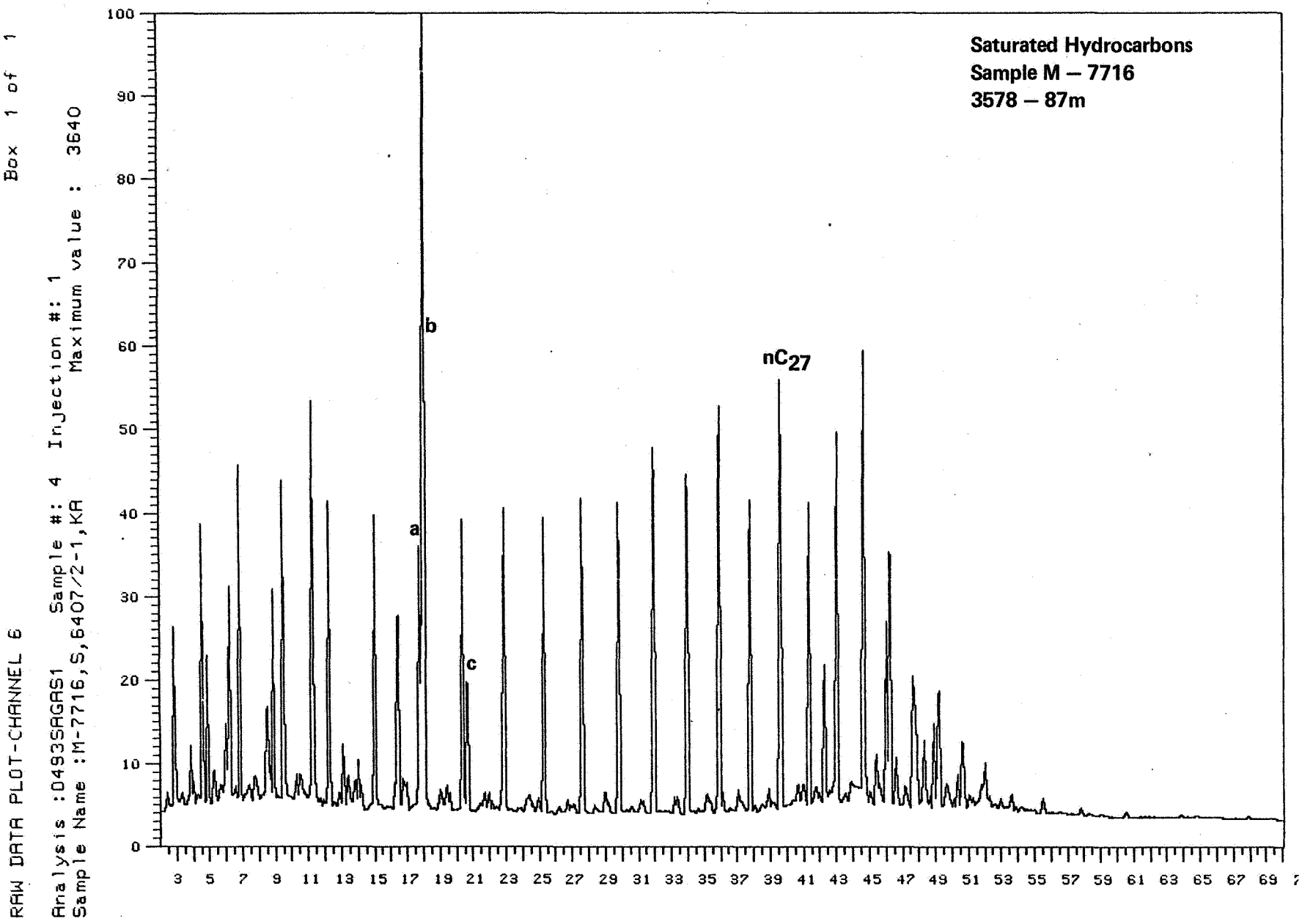

RAW DATA PLOT-CHANNEL 6
Box 1 of 1
Analysis :0493SAGAS2 Sample #: 1 Injection #: 1
Sample Name :M-7661,S,6407/2-1 Maximum value : 1889
Saturated Hydrocarbons
Sample M – 7661
3085 – 94m
a
b
c
nC27
100
90
80
70
60
50
40
30
20
10
0
3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51 53 55 57 59 61 63 65 67 69


RAW DATA PLOT-CHANNEL 6
Box 1 of 1
Analysis :0493SAGAS2 Sample #: 4 Injection #: 1
Sample Name :M-7665,S,6407/2-1 Maximum value : 2654
Saturated Hydrocarbons
Sample M – 7665
3121 – 30m
a
b
c
Ph
nC27


RAW DATA PLOT-CHANNEL 6
Analysis :0493M766951 Sample #: 1 Injection #: 1
Sample Name :M-7669,S,6407/2-1,KA Maximum value : 1521
Saturated Hydrocarbons
Sample M – 7669
3157 – 66m
a
b
c
Ph
nC27

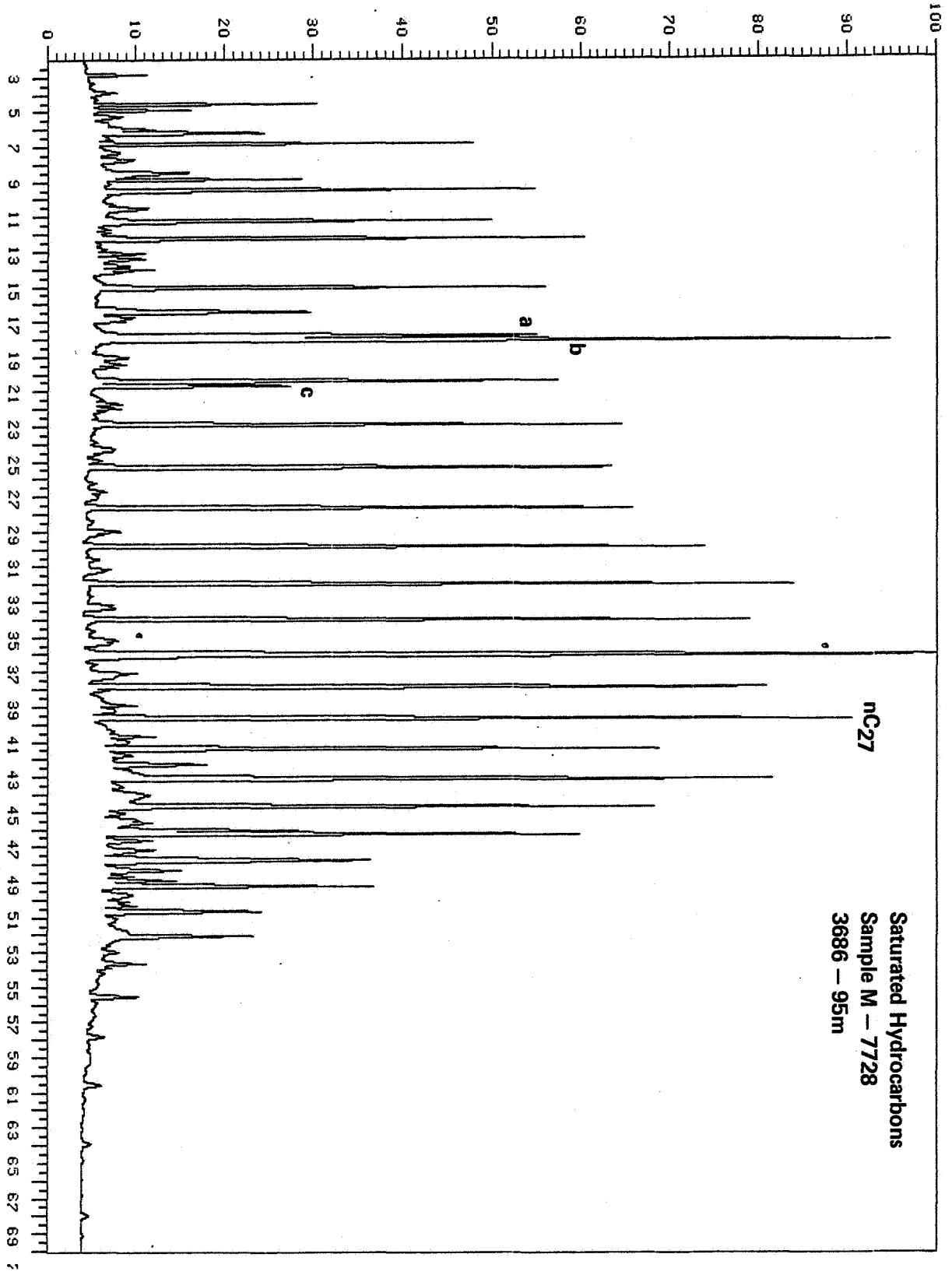

Box 1 of 1
RAW DATA PLOT-CHANNEL 6
Analysis :0493SAGAS1 Sample #: 2 Injection #: 1
Sample Name :M-7694,S,6407/2-1,KA Maximum value : 3424
Saturated Hydrocarbons
Sample M – 7694
3382 – 91m
a
b
c
nC27
100
90
80
70
60
50
40
30
20
10
0
3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51 53 55 57 59 61 63 65 67 69


RAW DATA PLOT-CHANNEL 6
Box 1 of 1
Analysis :0493SAGAS1 Sample #: 3 Injection #: 1
Sample Name :M-7704,S,6407/2-1,KA Maximum value : 3004
Saturated Hydrocarbons
Sample M – 7704
3472 – 81m
a
b
c
nC27
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


Box 1 of 1
RAW DATA PLOT-CHANNEL 6
Analysis :0493SAGAS1 Sample #: 4 Injection #: 1
Sample Name :M-7716,S,6407/2-1,KA Maximum value : 3640
Saturated Hydrocarbons
Sample M – 7716
3578 – 87m
a
b
c
nC27
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

RAW DATA PLOT-CHANNEL 6 Box 1 of 1

Analysis :0493M7728S1 Sample #: 1 Injection #: 1
Sample Name :M-7728,S,6407/2-1,KA Maximum value : 3606



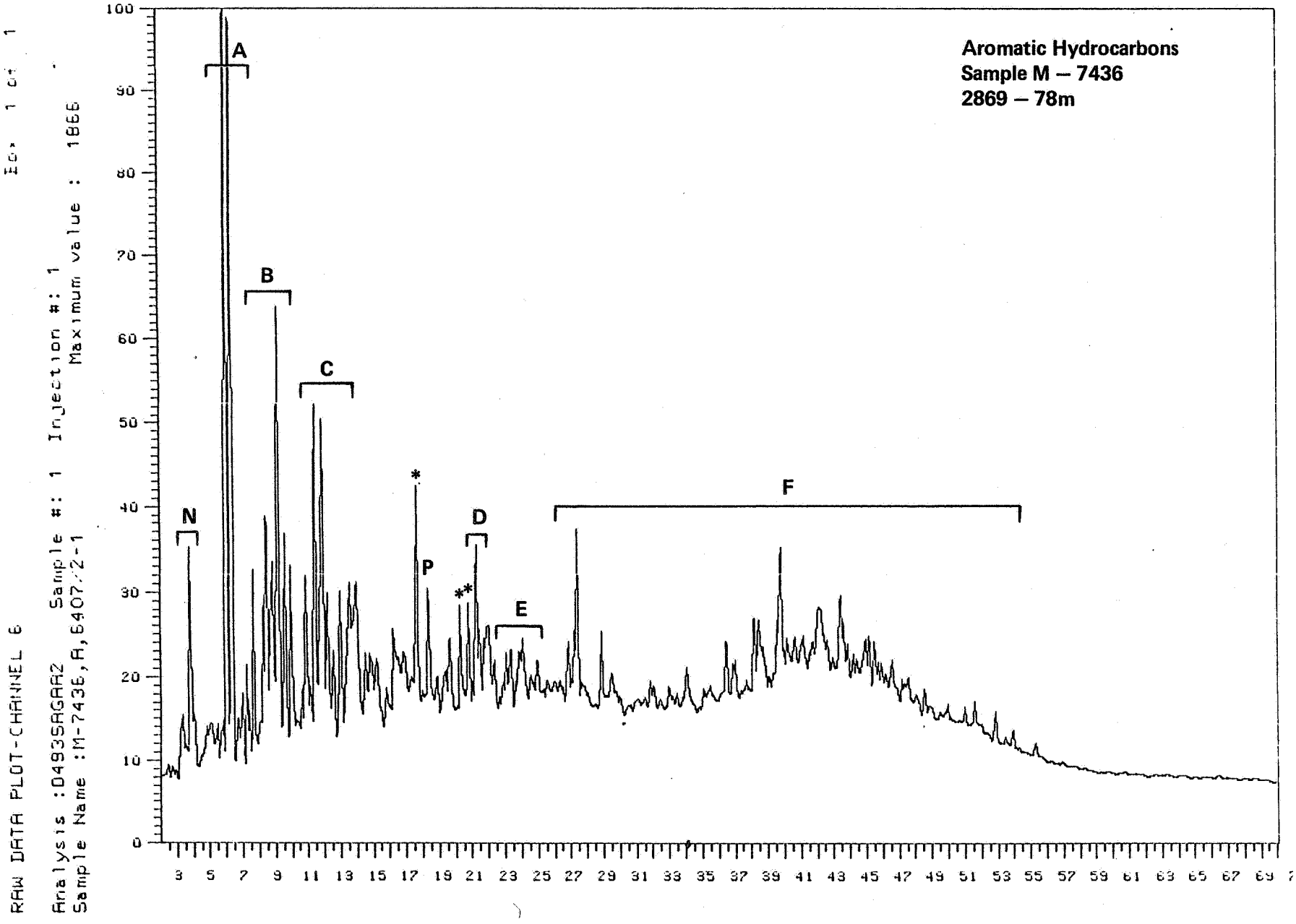
AROMATIC HYDROCARBON GAS CHROMATOGRAMS

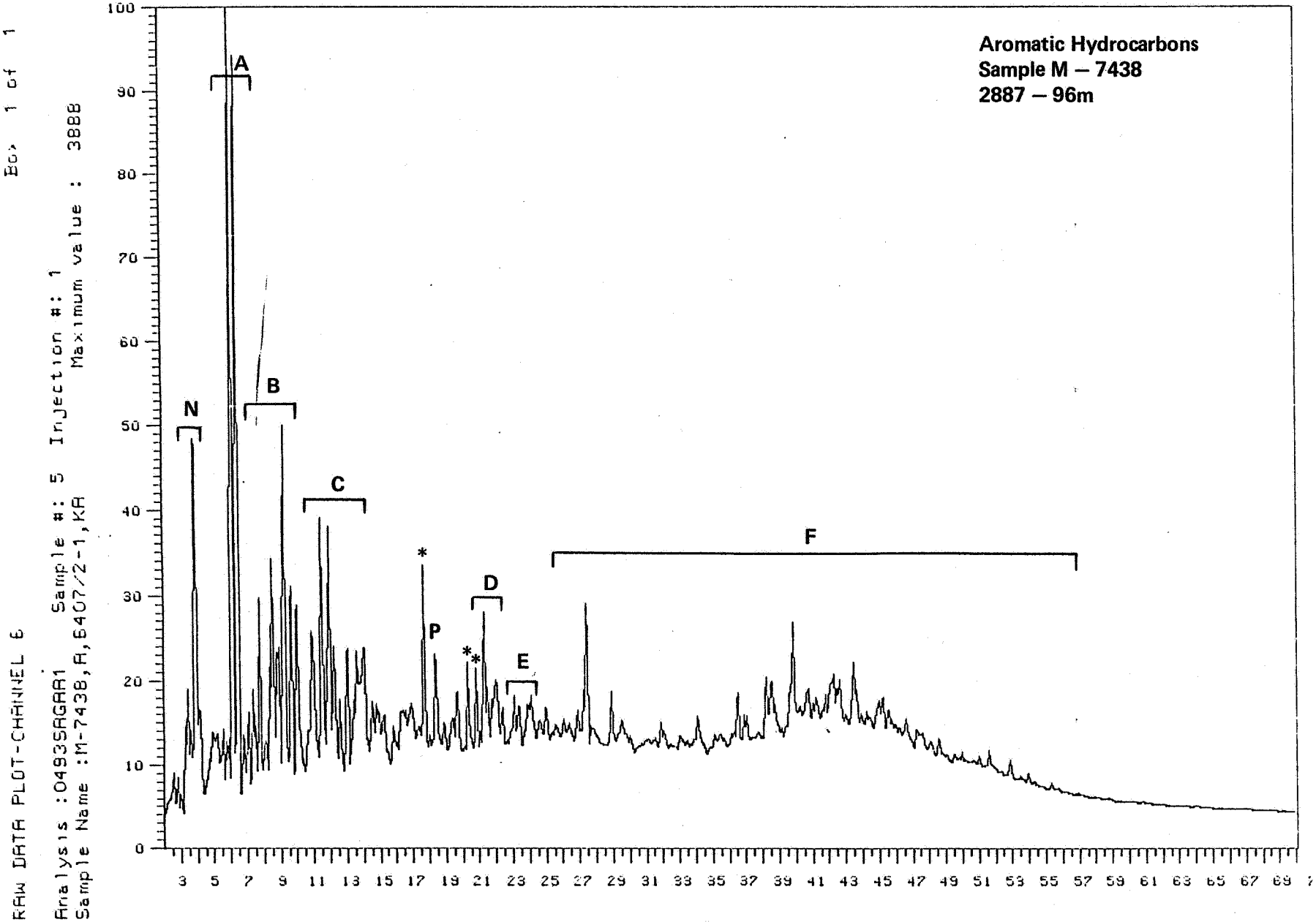
N = Naphthalene
A = C_1 - naphthalenes
B = C_2 - naphthalenes
C = C_3 - naphthalenes

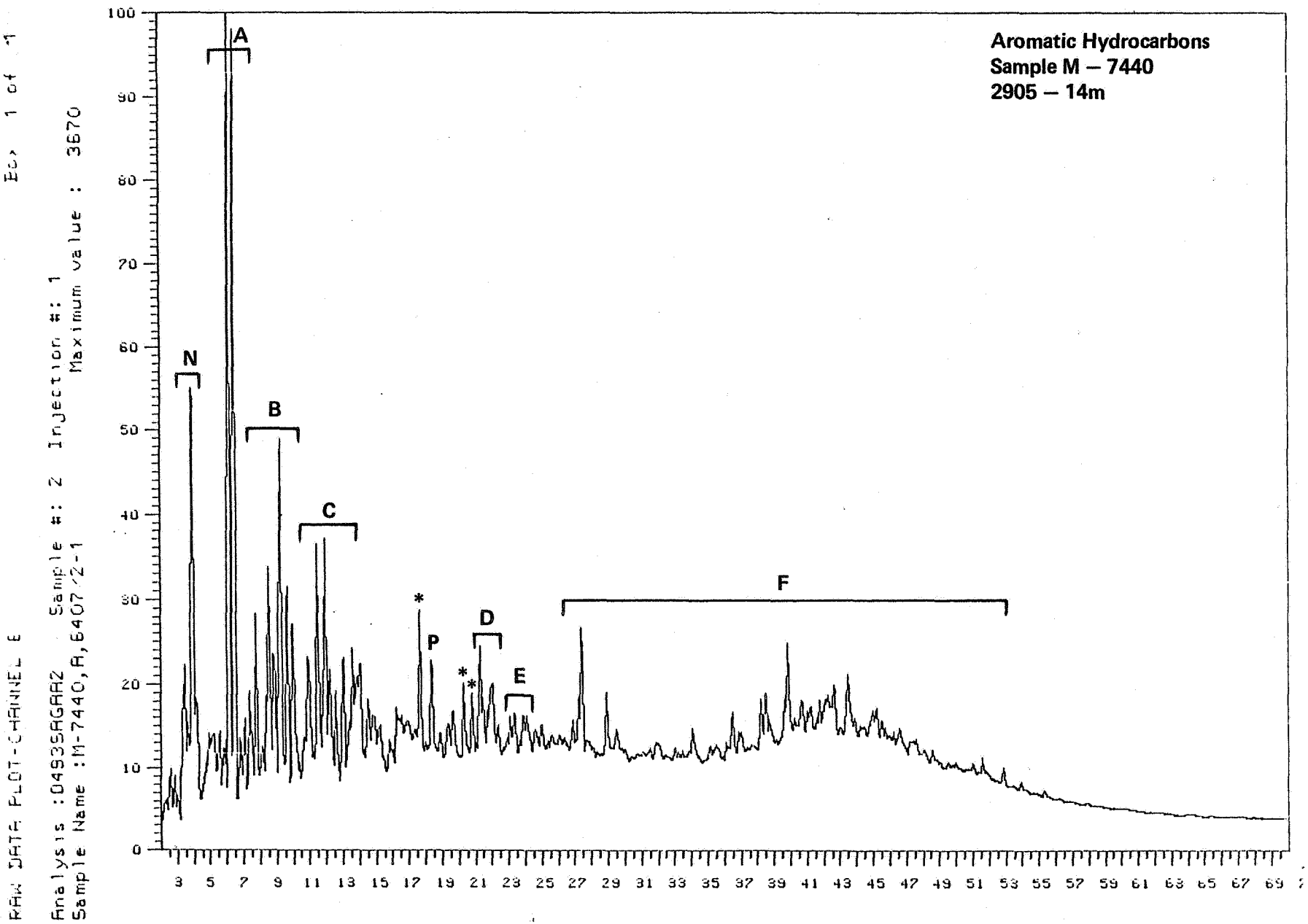
P = Phenanthrene
D = C_1 - phenanthrenes
E = C_2 - phenanthrenes

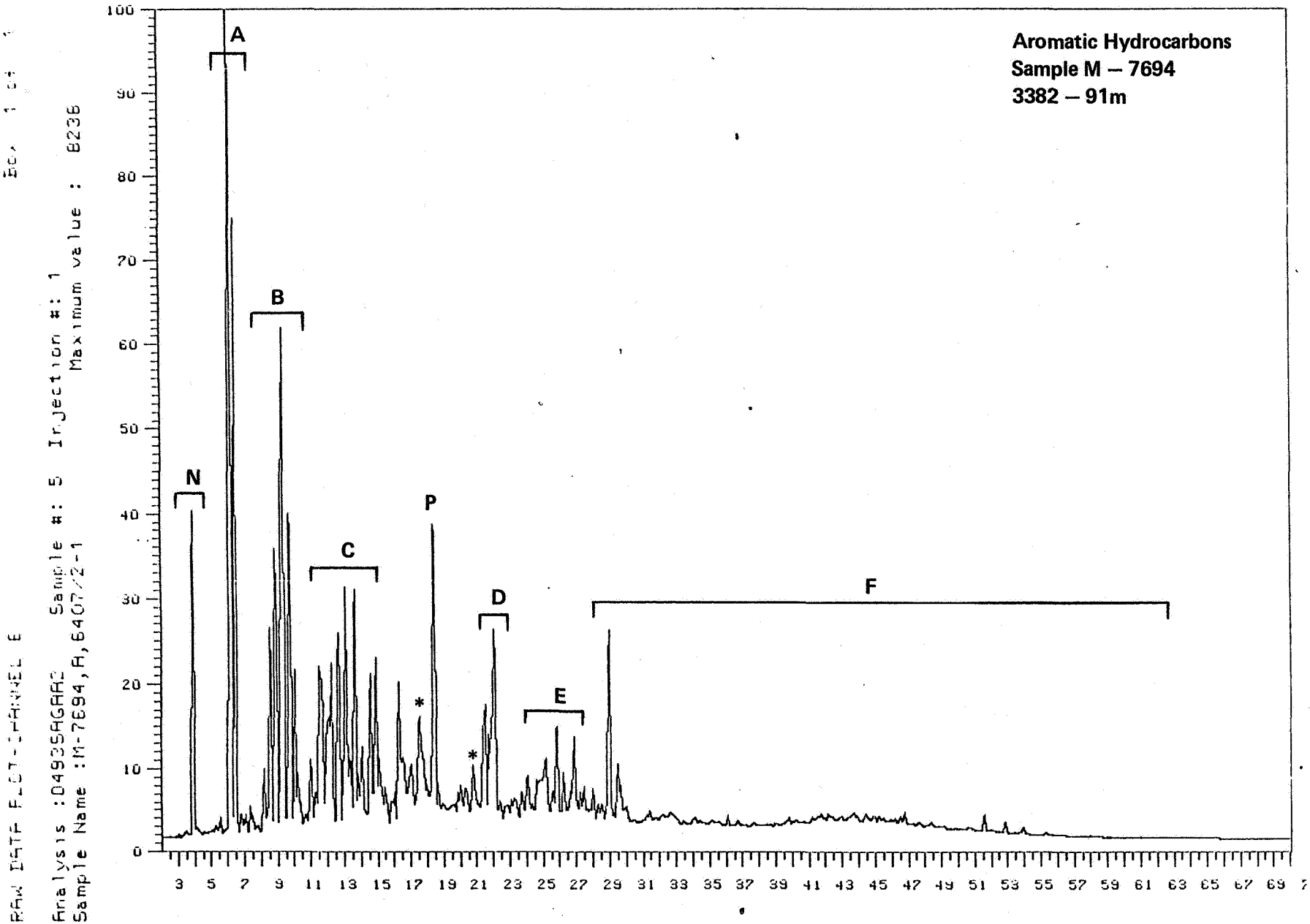
F = Region in which aromatised steranes/triterpanes are present

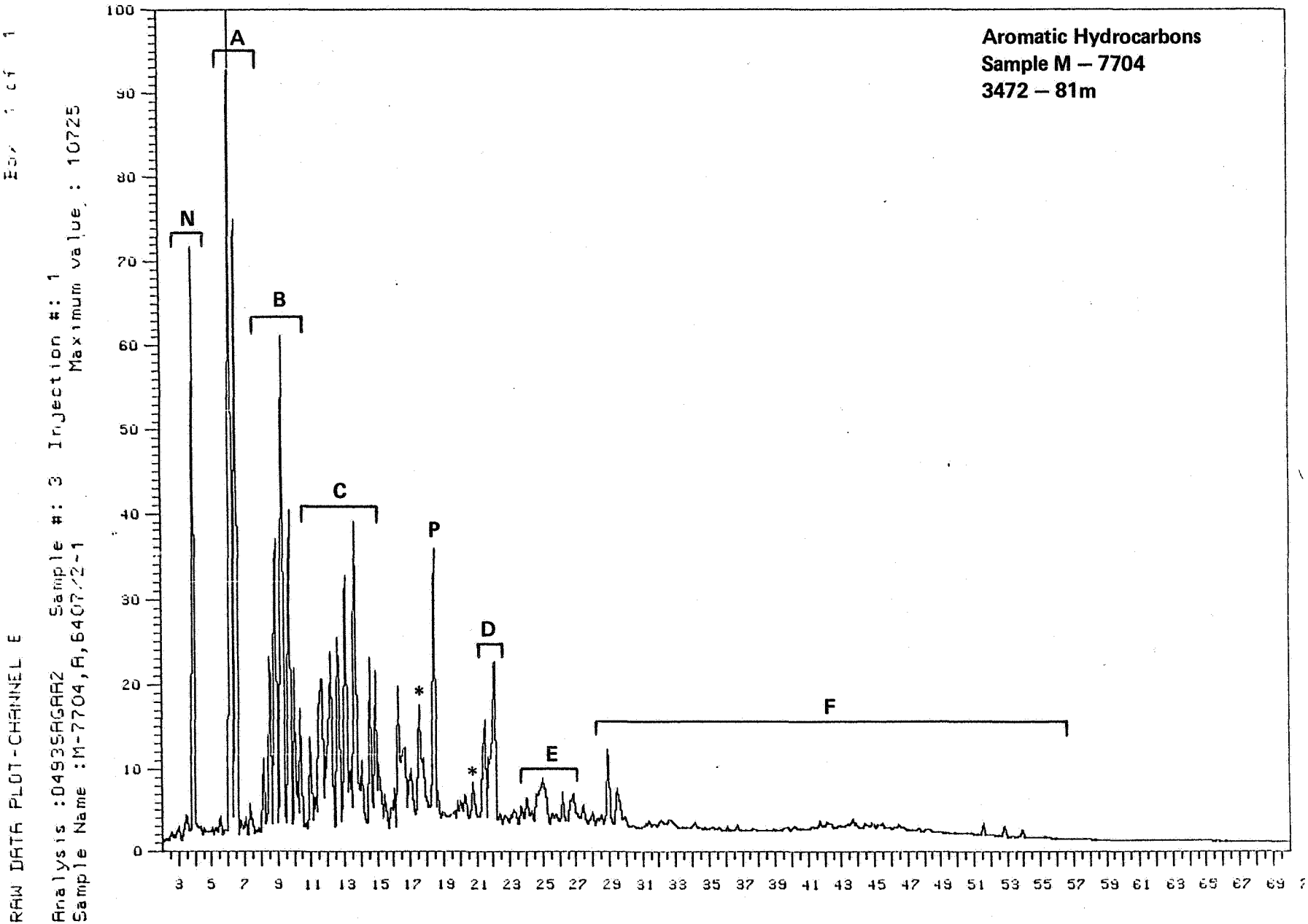
* = Probable organic sulphur compounds.

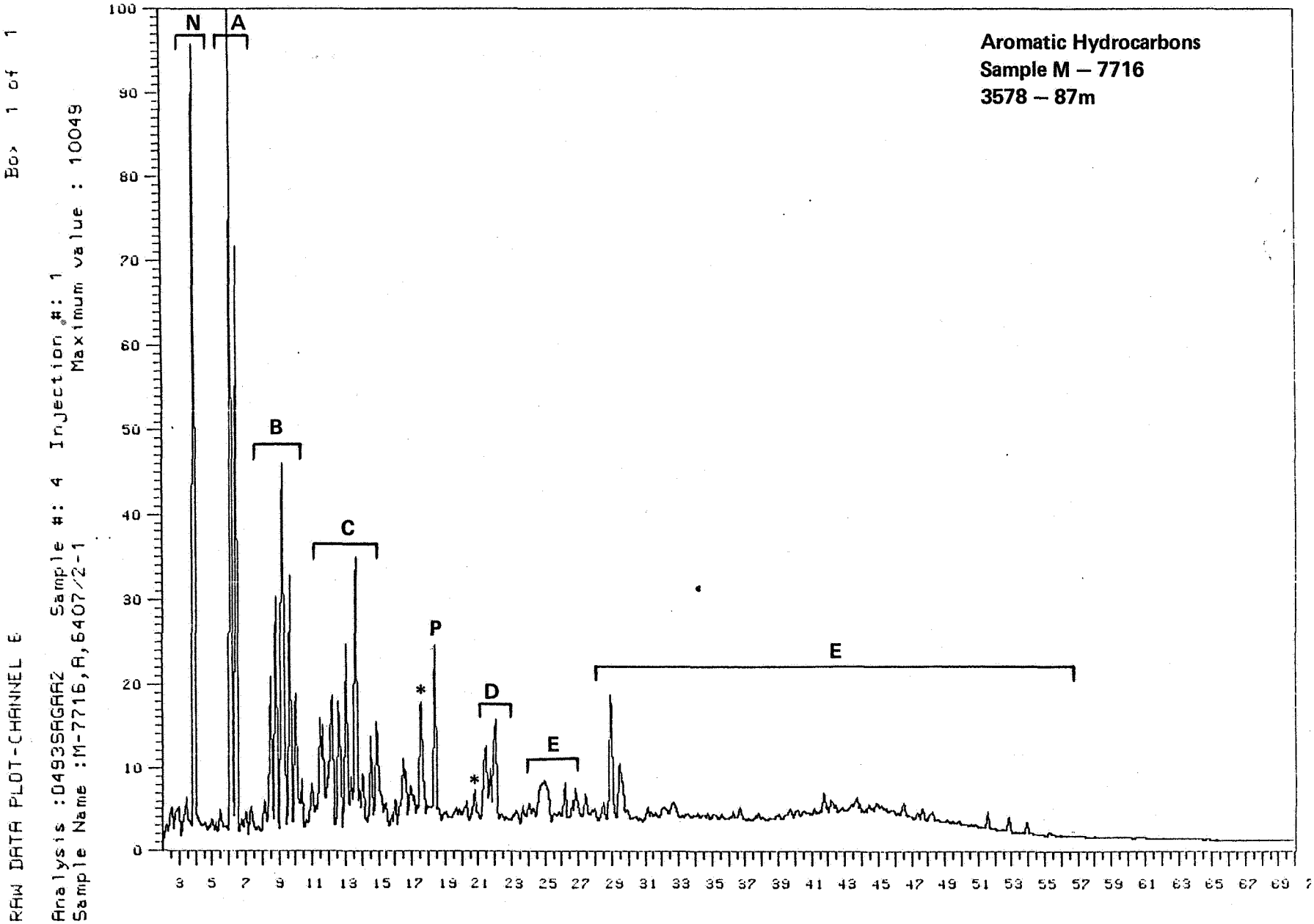

RAW DATA PLOT-CHANNEL 6
Analysis :0493SAGAA2 Sample #: 1 Injection #: 1
Sample Name :M-7436,A,6407/2-1 Maximum value : 1866
Aromatic Hydrocarbons
Sample M – 7436
2869 – 78m
A
B
C
D
E
F
N
P
*
**

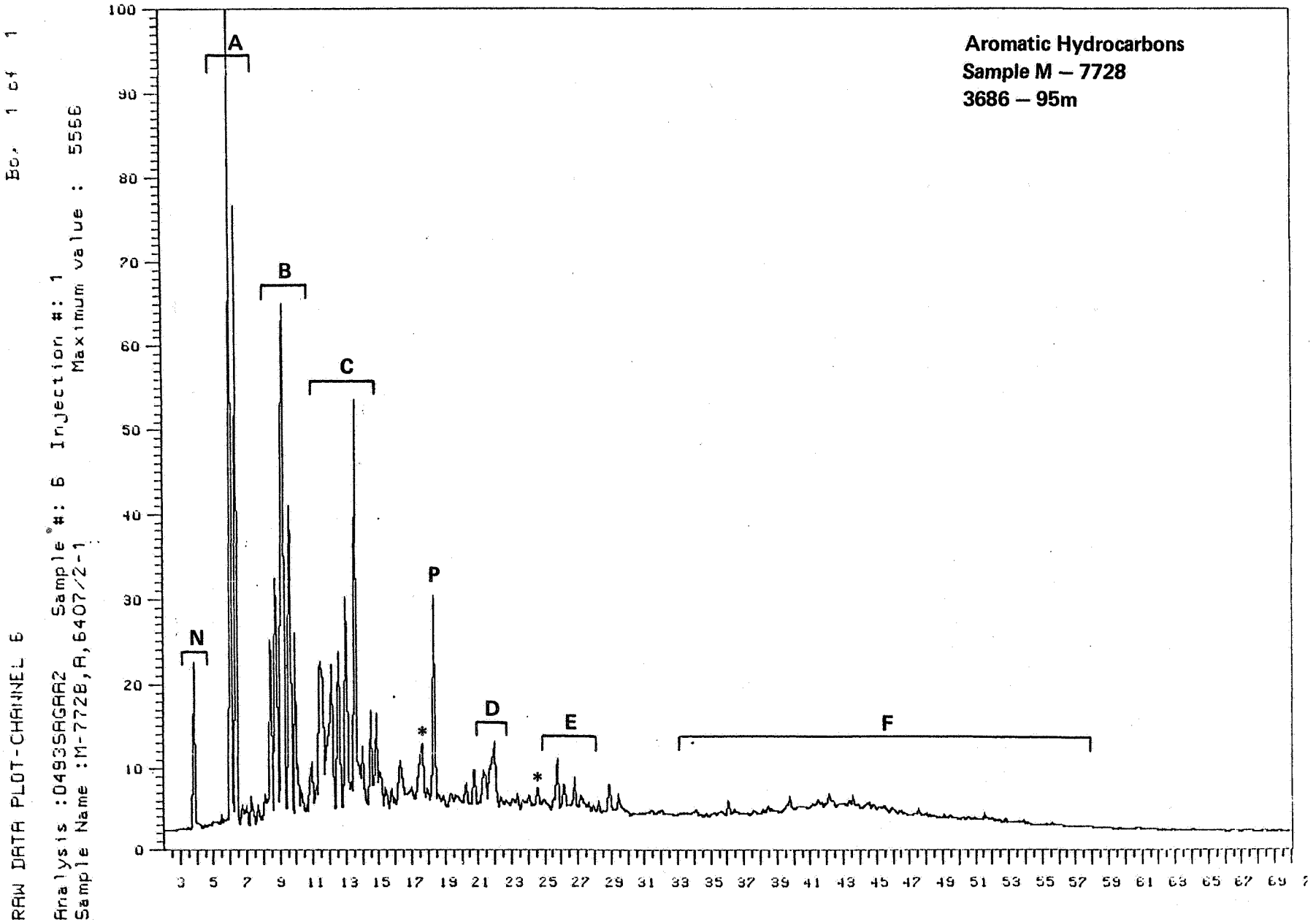

Aromatic Hydrocarbons
Sample M – 7438
2887 – 96m
RAW DATA PLOT-CHANNEL 6
Analysis :0493SAGAR1 Sample #: 5 Injection #: 1
Sample Name :M-7438,A,6407/2-1,KA Maximum value : 3888
A
B
C
D
E
F
N
P
*
*
*


RAW DATA PLOT-CHANNEL E
Page 1 of 1
Analysis :04935AGRAZ Sample #: 2 Injection #: 1
Sample Name :M-7440,A,6407/2-1 Maximum value : 3670
Aromatic Hydrocarbons
Sample M – 7440
2905 – 14m
A
N
B
C
P
D
E
F
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


Aromatic Hydrocarbons
Sample M – 7694
3382 – 91m
A
B
C
D
E
F
N
P
*
*
Analysis :04935AGAR2 Sample #: 5 Injection #: 1
Sample Name :M-7694,A,6407/2-1 Maximum value : 8236
RAW DATA PLOT-CHANNEL E

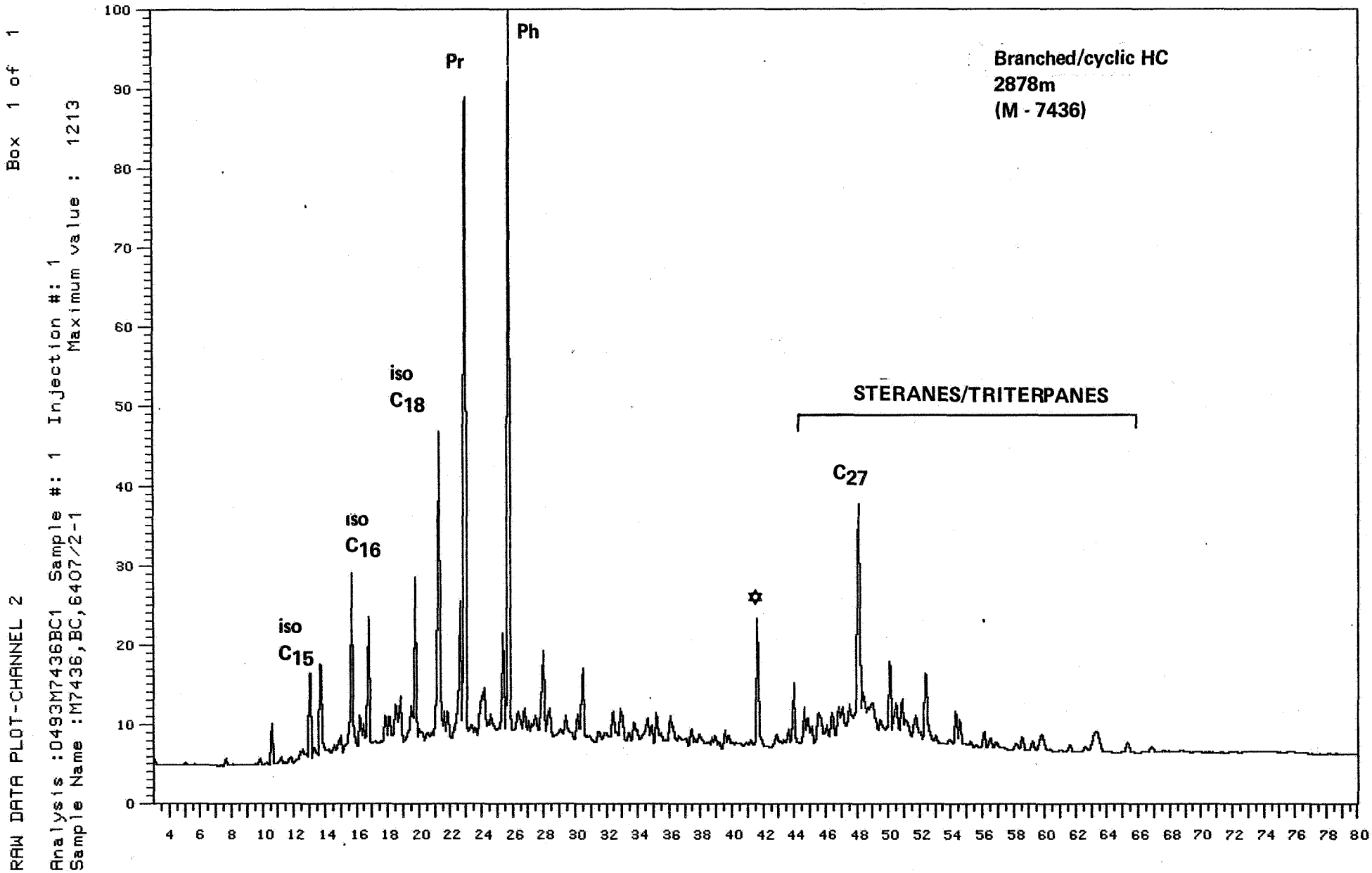

RAW DATA PLOT-CHANNEL E
Analysis :0493SAGAR2 Sample #: 3 Injection #: 1
Sample Name :M-7704,A,6407?2-1 Maximum value : 10725
Aromatic Hydrocarbons
Sample M – 7704
3472 – 81m
N
A
B
C
P
D
E
F
*
*
100
90
80
70
60
50
40
30
20
10
0
3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51 53 55 57 59 61 63 65 67 69

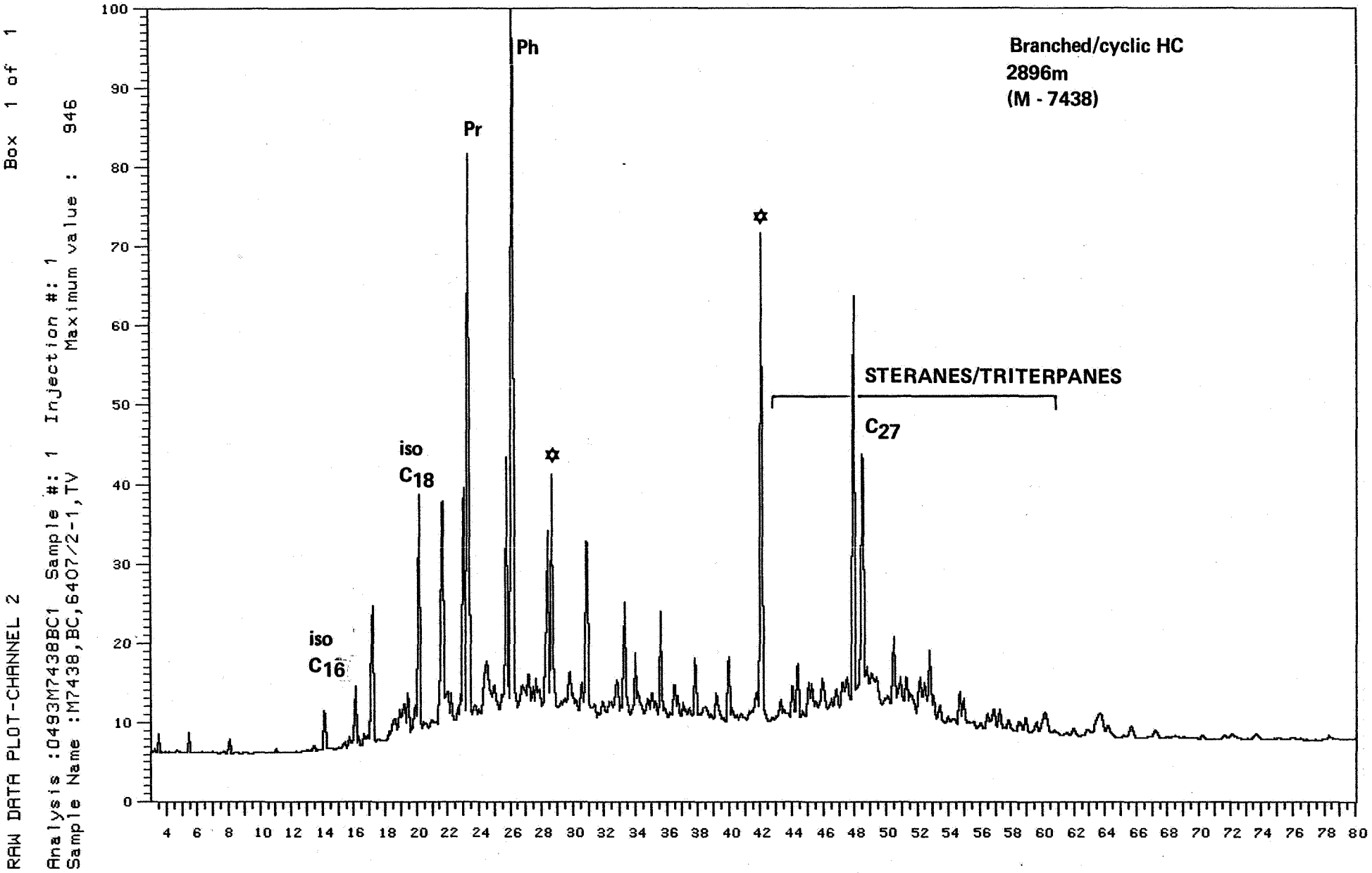

RAW DATA PLOT-CHANNEL E
Box 1 of 1
Analysis :0493SAGAR2 Sample #: 4 Injection #: 1
Sample Name :M-7716,A,6407/2-1 Maximum value : 10049
Aromatic Hydrocarbons
Sample M – 7716
3578 – 87m
N
A
B
C
P
D
E
E
*
*
100
90
80
70
60
50
40
30
20
10
0
3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51 53 55 57 59 61 63 65 67 69

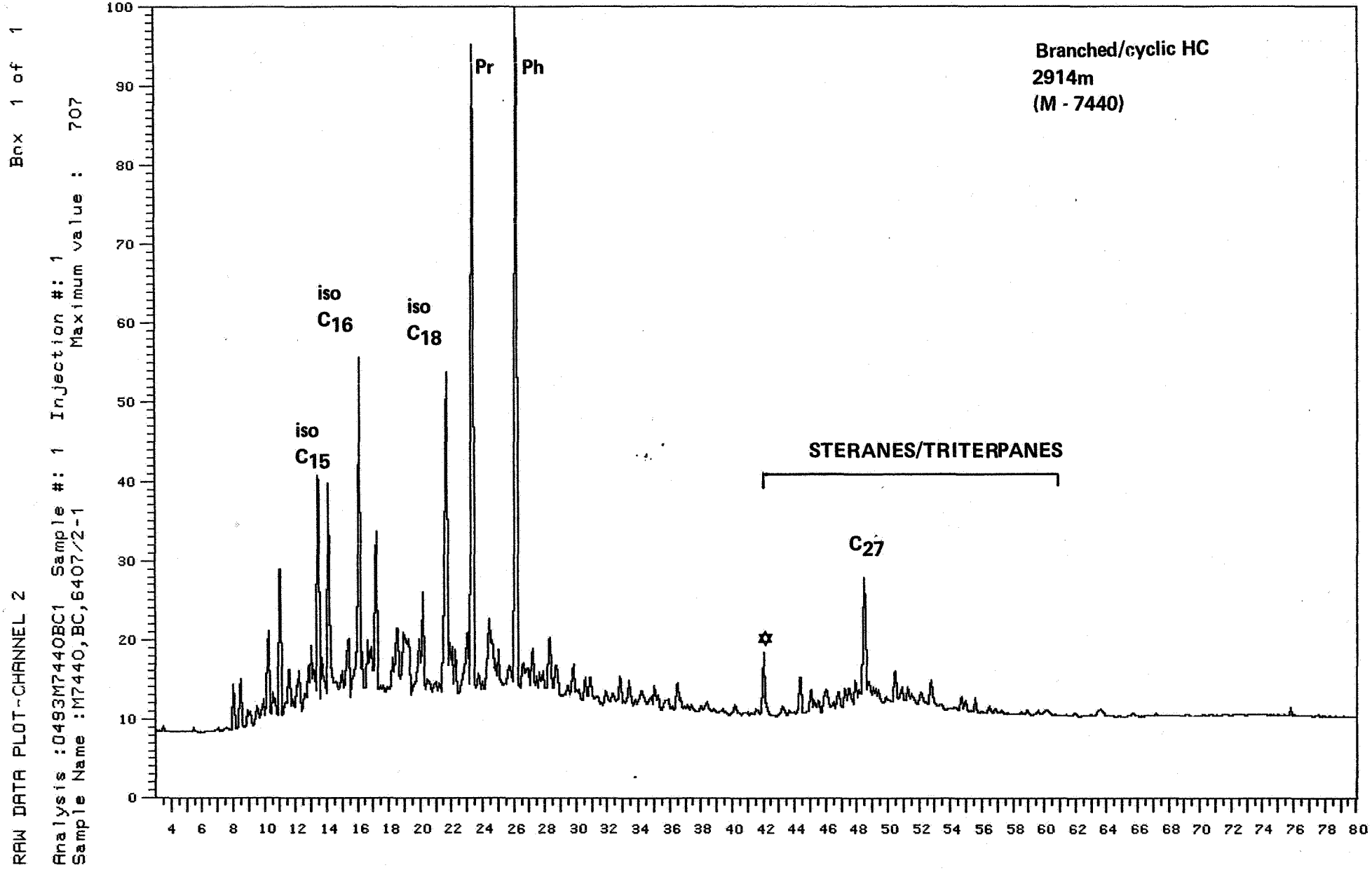

RAW DATA PLOT-CHANNEL 6
Pg. 1 of 1
Analysis :0493SAGAA2 Sample #: 6 Injection #: 1
Sample Name :M-7728,A,6407/2-1 Maximum value : 5556
Aromatic Hydrocarbons
Sample M – 7728
3686 – 95m
A
B
C
P
D
E
F
N
100
90
80
70
60
50
40
30
20
10
0
3 5 7 9 11 13 15 17 19 21 23 25 27 29 31 33 35 37 39 41 43 45 47 49 51 53 55 57 59 61 63 65 67 69

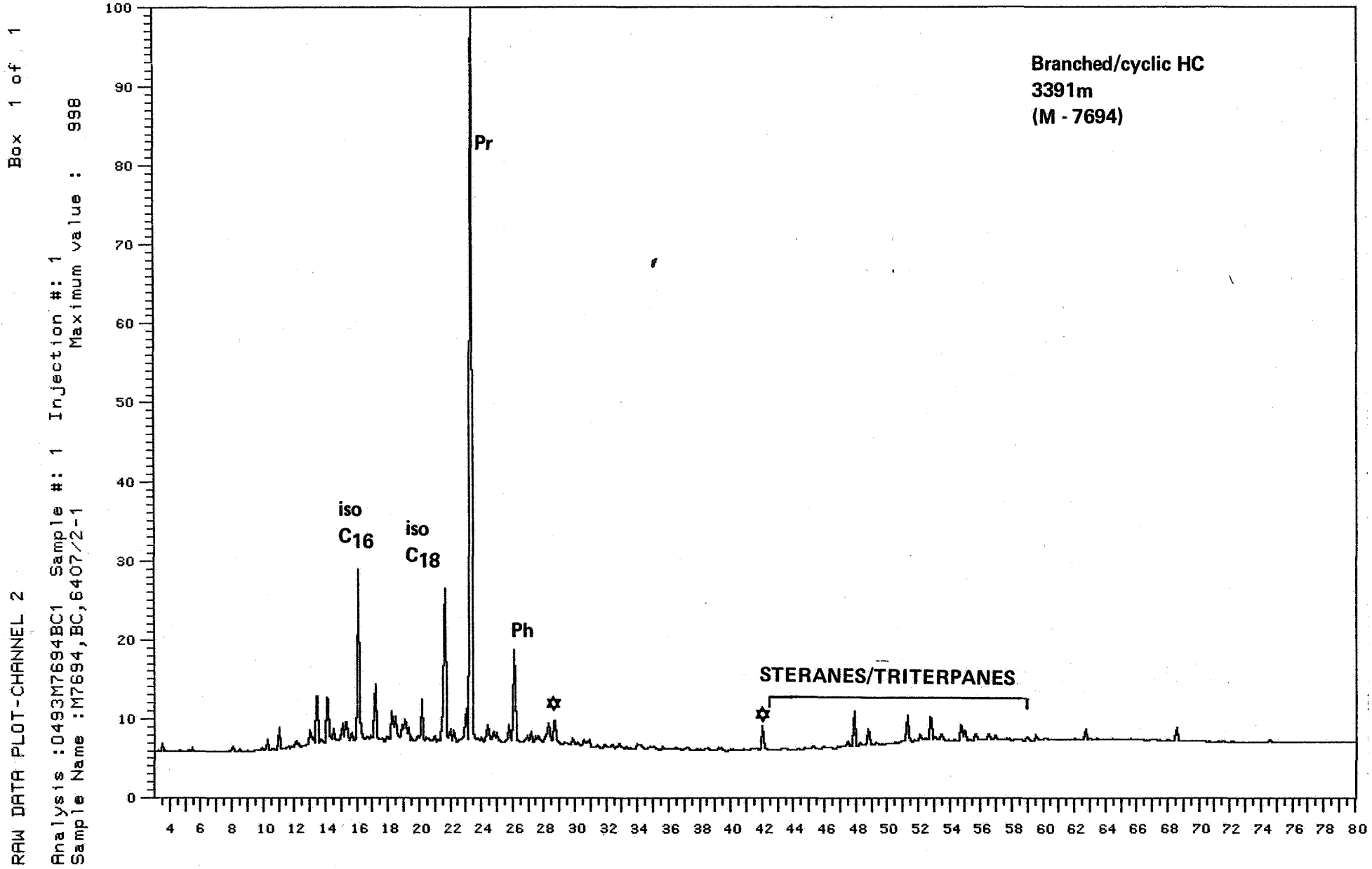
BRANCHED/CYCLIC HYDROCARBON GAS CHROMATOGRAMS

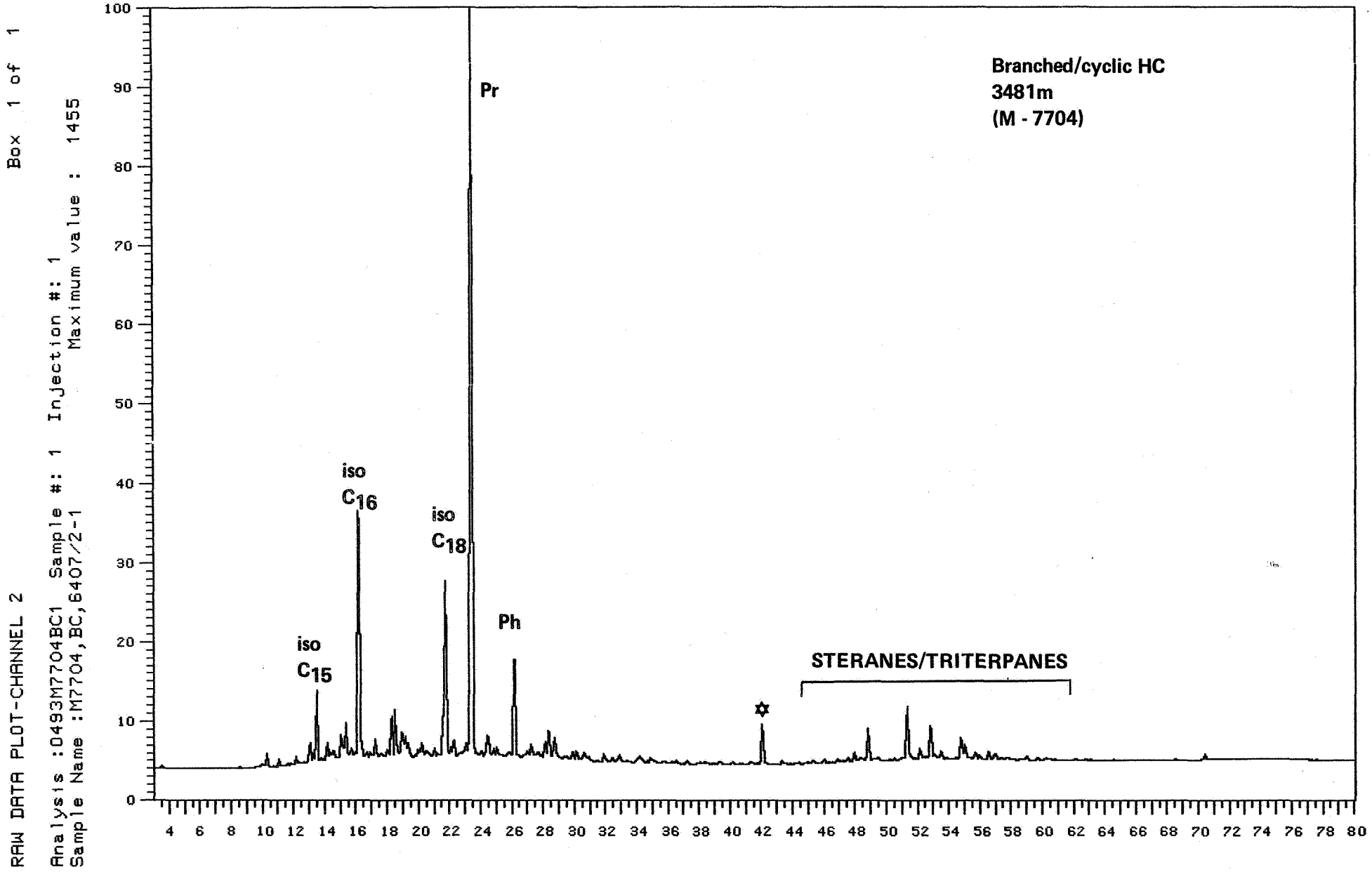
iso C_{15}	= C_{15} isoprenoid
iso C_{16}	= C_{16} "
iso C_{18}	= C_{18} "
Pr	= pristane
Ph	= phytane
*	= phthalate
C_{27}	= C_{27} - triterpane

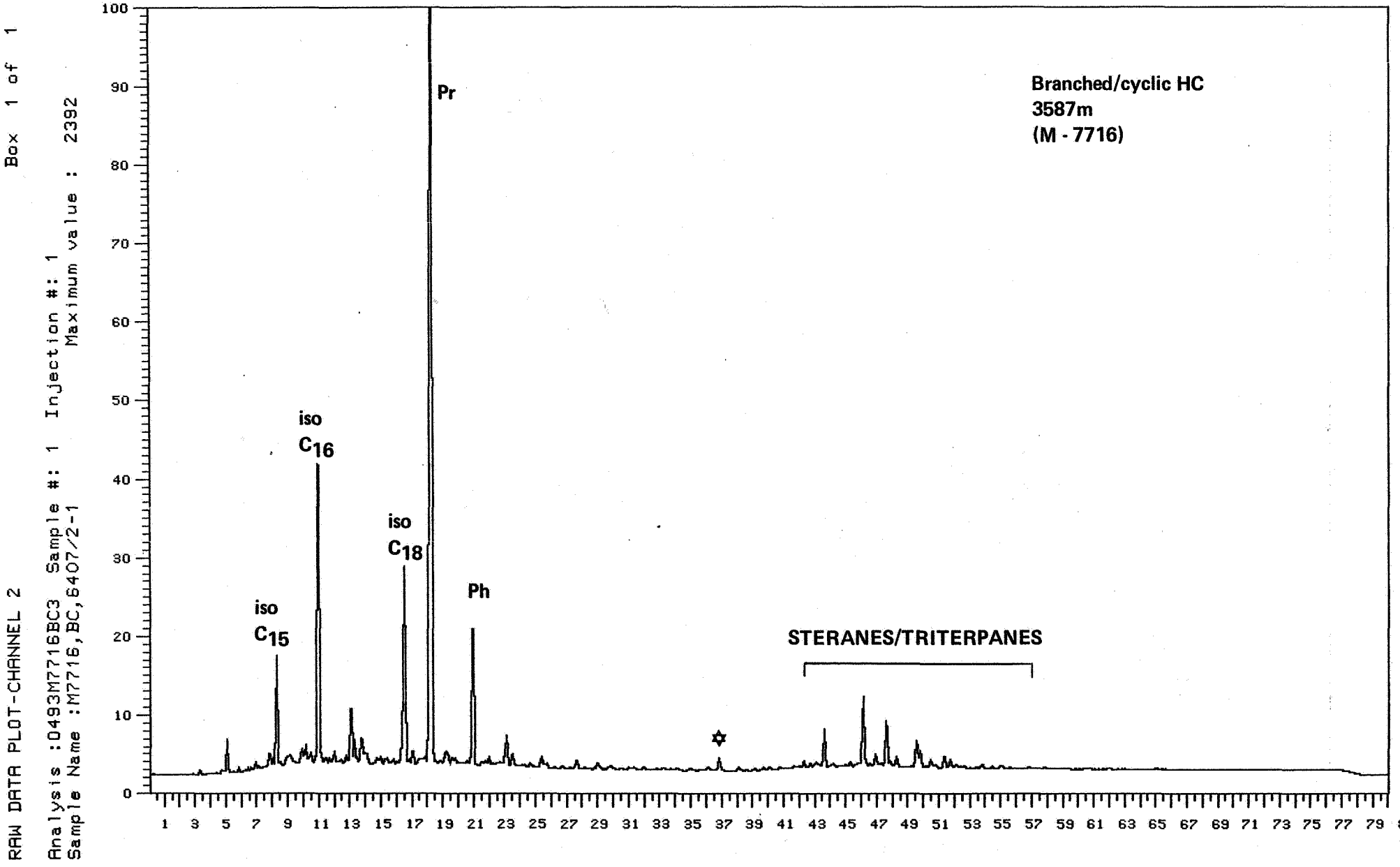

RAW DATA PLOT-CHANNEL 2
Box 1 of 1
Analysis :0493M7436BC1 Sample #: 1 Injection #: 1
Sample Name :M7436,BC,6407/2-1 Maximum value : 1213
Ph
Pr
iso C18
iso C16
iso C15
Branched/cyclic HC
2878m
(M - 7436)
STERANES/TRITERPANES
C27
100
90
80
70
60
50
40
30
20
10
0
4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72 74 76 78 80

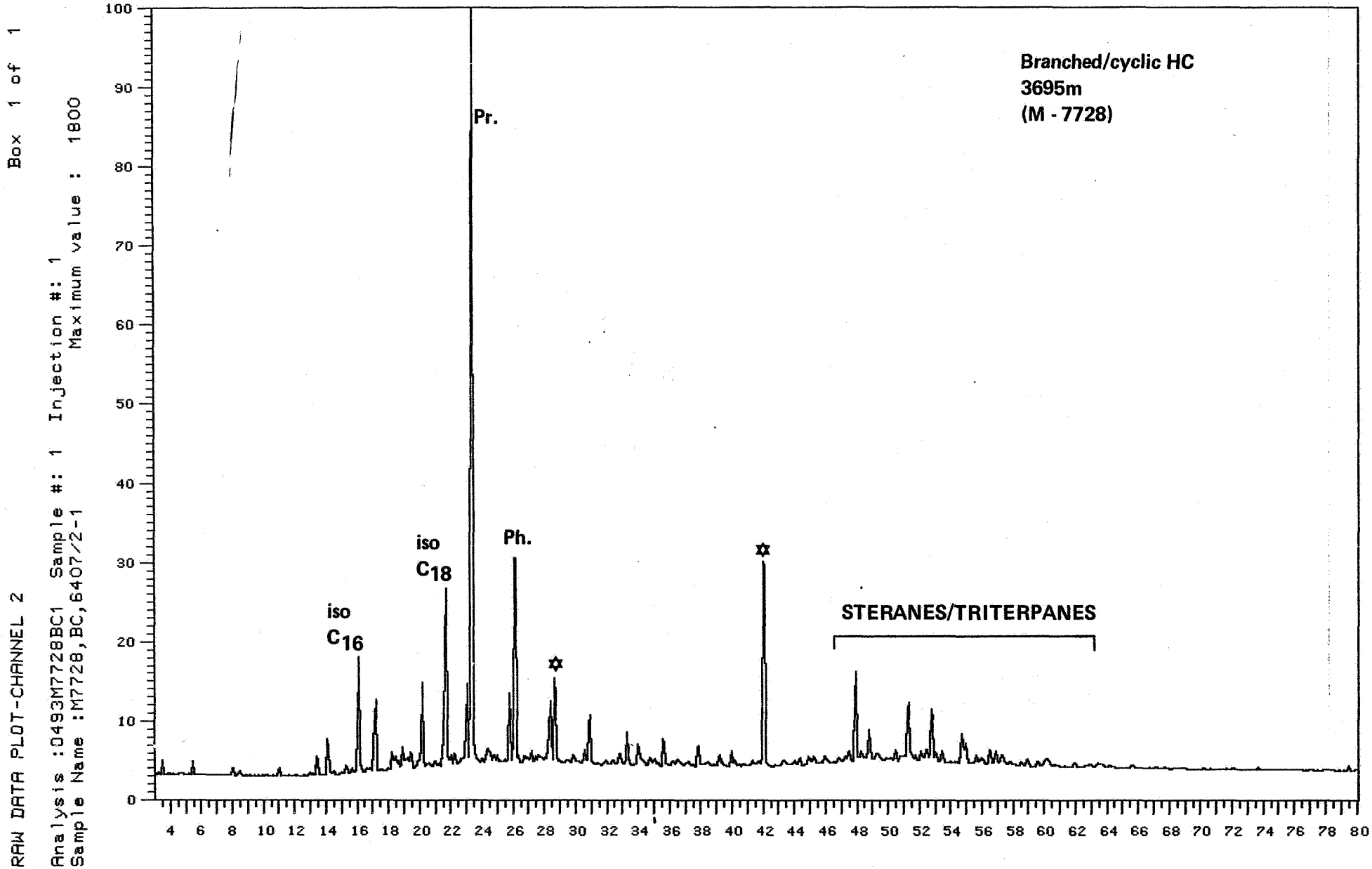

RAW DATA PLOT-CHANNEL 2
Box 1 of 1
Analysis :0493M7438BC1 Sample #: 1 Injection #: 1
Sample Name :M7438,BC,6407/2-1,TV Maximum value : 946
Branched/cyclic HC
2896m
(M - 7438)
Ph
Pr
iso
C18
iso
C16
STERANES/TRITERPANES
C27
100
90
80
70
60
50
40
30
20
10
0
4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72 74 76 78 80


Box 1 of 1
RAW DATA PLOT-CHANNEL 2
Analysis :0493M7440BC1 Sample #: 1 Injection #: 1
Sample Name :M7440,BC,6407/2-1 Maximum value : 707
Branched/cyclic HC
2914m
(M - 7440)
Pr
Ph
iso C15
iso C16
iso C18
STERANES/TRITERPANES
C27
100
90
80
70
60
50
40
30
20
10
0
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


RAW DATA PLOT-CHANNEL 2
Box 1 of 1
Analysis :0493M7694BC1 Sample #: 1 Injection #: 1
Sample Name :M7694,BC,6407/2-1 Maximum value : 998
Branched/cyclic HC
3391m
(M - 7694)
Pr
iso C16
iso C18
Ph
STERANES/TRITERPANES
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

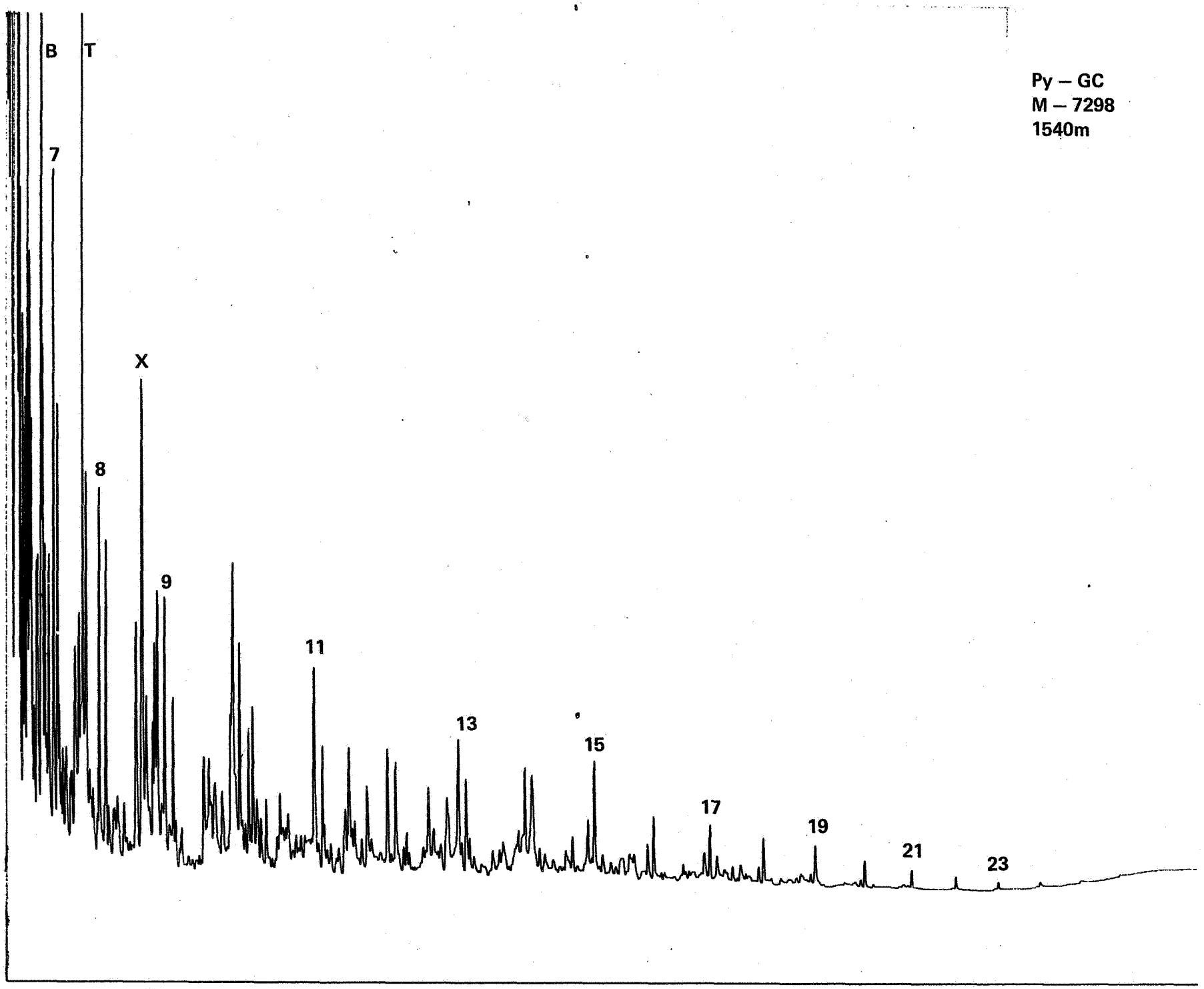

RAW DATA PLOT-CHANNEL 2
Box 1 of 1
Analysis :0493M7704BC1 Sample #: 1 Injection #: 1
Sample Name :M7704,BC,6407/2-1 Maximum value : 1455
Branched/cyclic HC
3481m
(M - 7704)
Pr
Ph
iso C15
iso C16
iso C18
STERANES/TRITERPANES
100
90
80
70
60
50
40
30
20
10
0
4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72 74 76 78 80

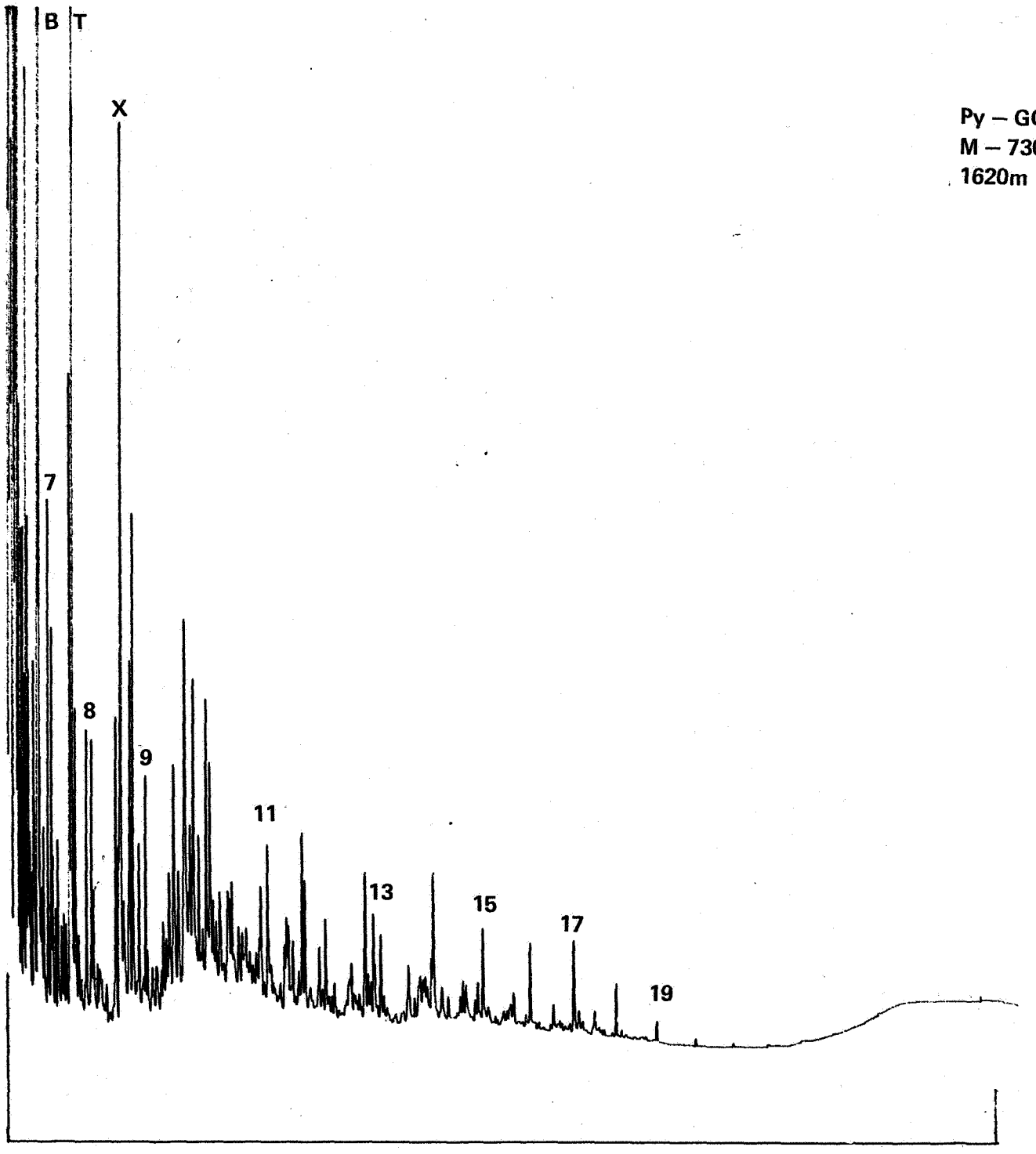

RAW DATA PLOT-CHANNEL 2
Box 1 of 1
Analysis :0493M7716BC3 Sample #: 1 Injection #: 1
Sample Name :M7716,BC,6407/2-1 Maximum value : 2392
Pr
iso C16
iso C18
iso C15
Ph
STERANES/TRITERPANES
Branched/cyclic HC
3587m
(M - 7716)

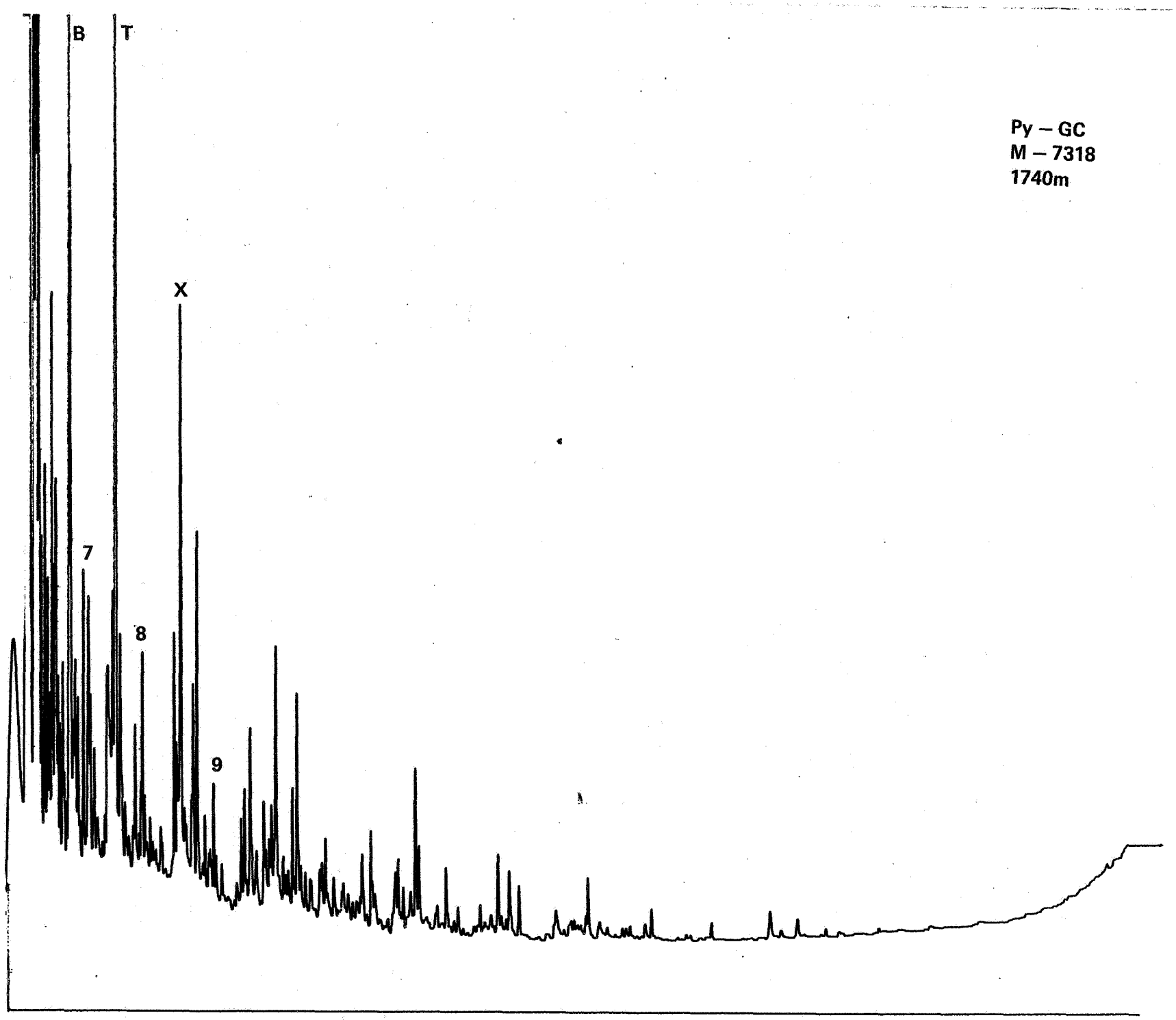

RAW DATA PLOT-CHANNEL 2
Box 1 of 1
Analysis :0493M7728BC1 Sample #: 1 Injection #: 1
Sample Name :M7728,BC,6407/2-1 Maximum value : 1800
Branched/cyclic HC
3695m
(M - 7728)
Pr.
Ph.
iso C16
iso C18
STERANES/TRITERPANES
100
90
80
70
60
50
40
30
20
10
0
4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36 38 40 42 44 46 48 50 52 54 56 58 60 62 64 66 68 70 72 74 76 78 80

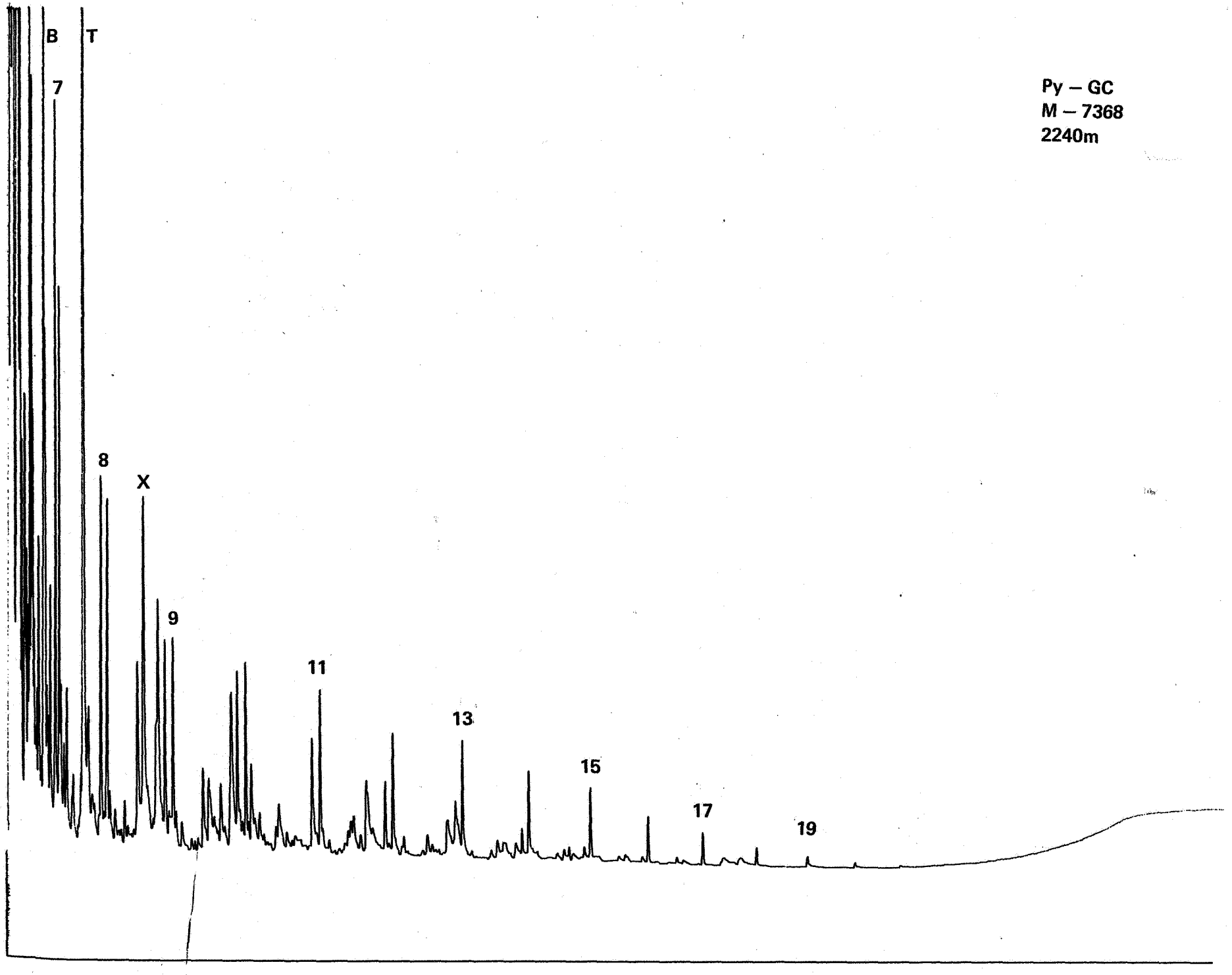
PYROLYSIS - GAS CHROMATOGRAMS

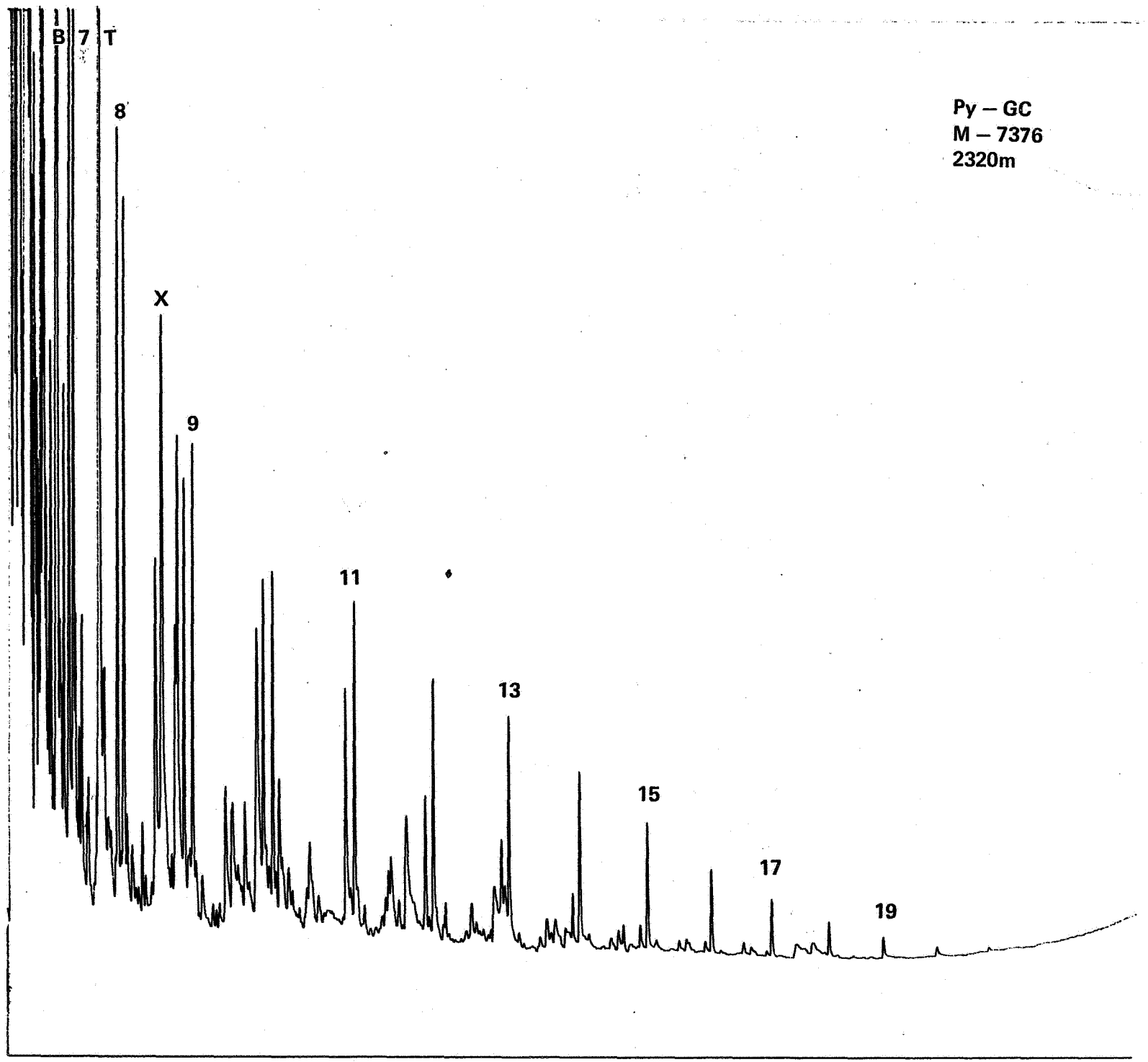
B = Benzene
T = Toluene
X = m- and p-xylenes
Pr = Pristenes

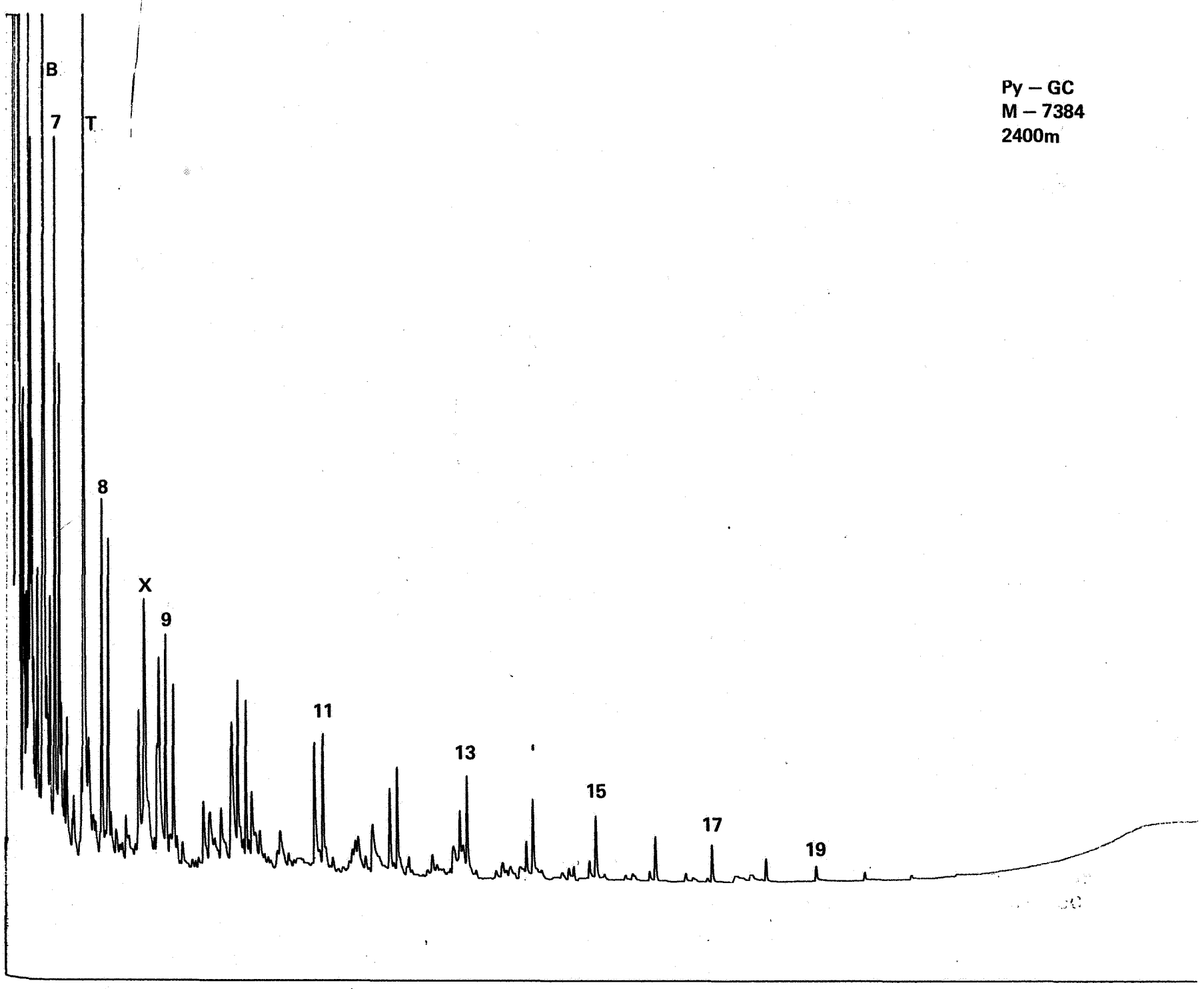

B
T
7
X
8
9
11
13
15
17
19
21
23
Py – GC
M – 7298
1540m

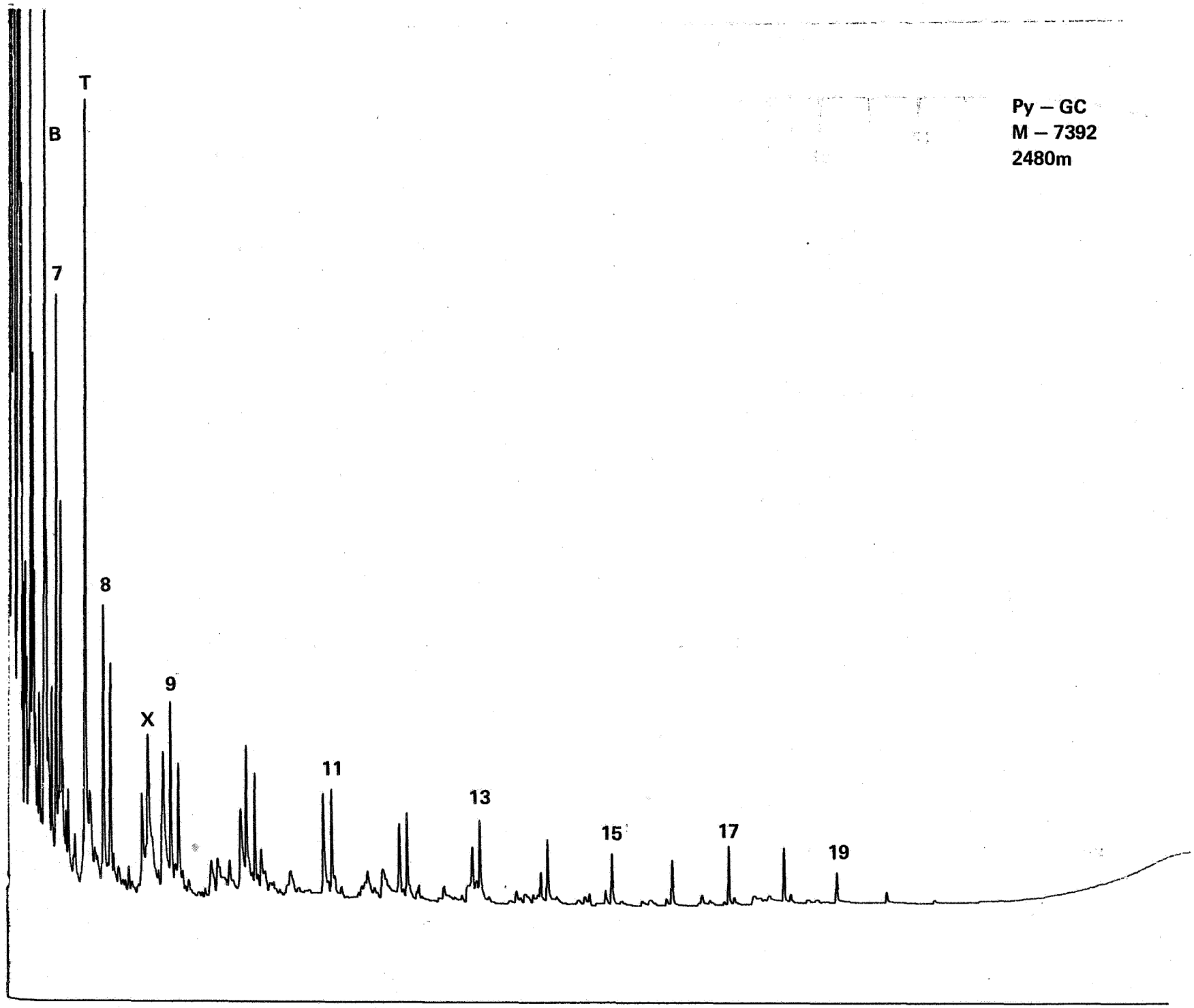

B
T
X
7
8
9
11
13
15
17
19
Py – GC
M – 7306
1620m

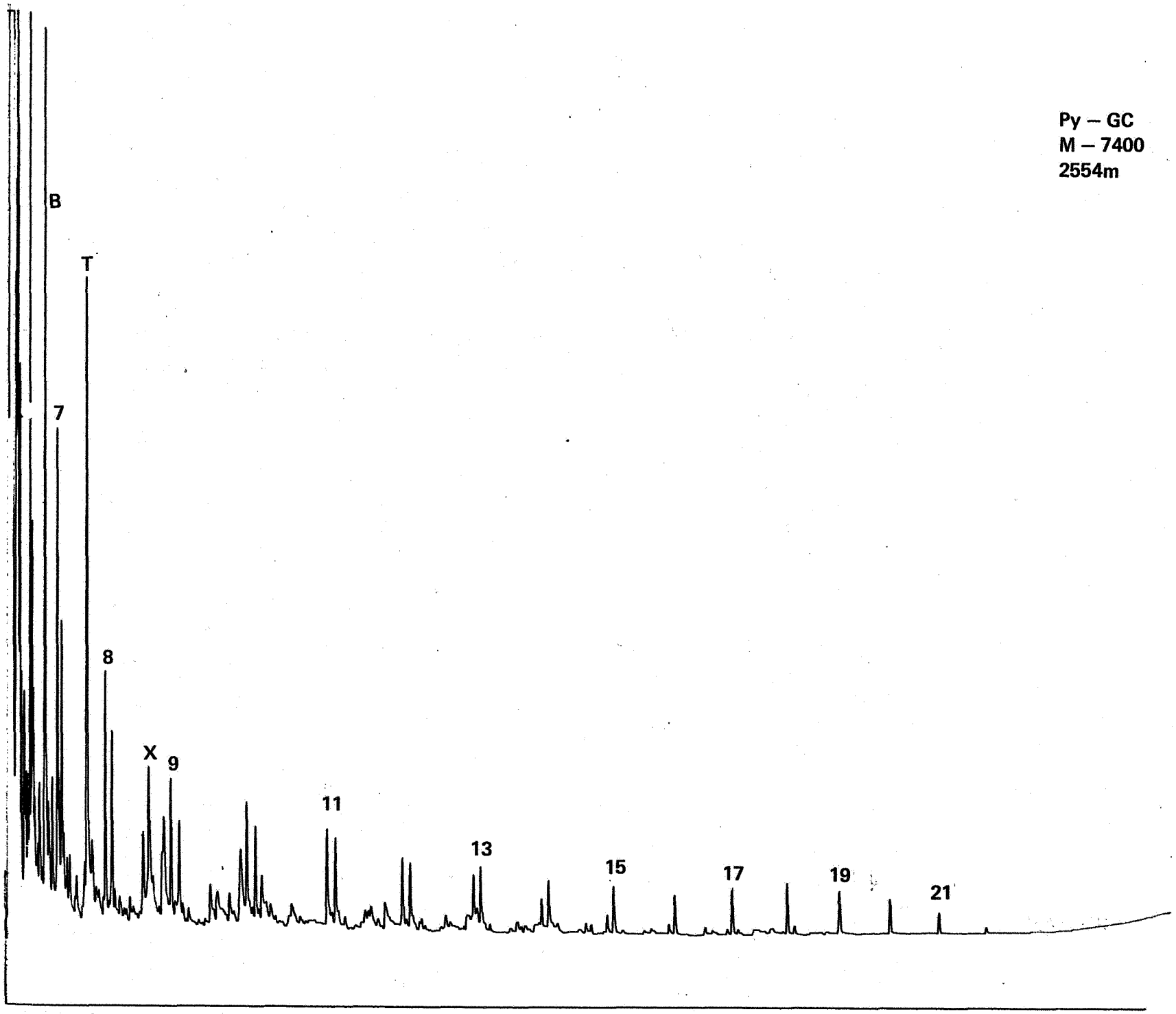

B
T
X
7
8
9
Py – GC
M – 7318
1740m

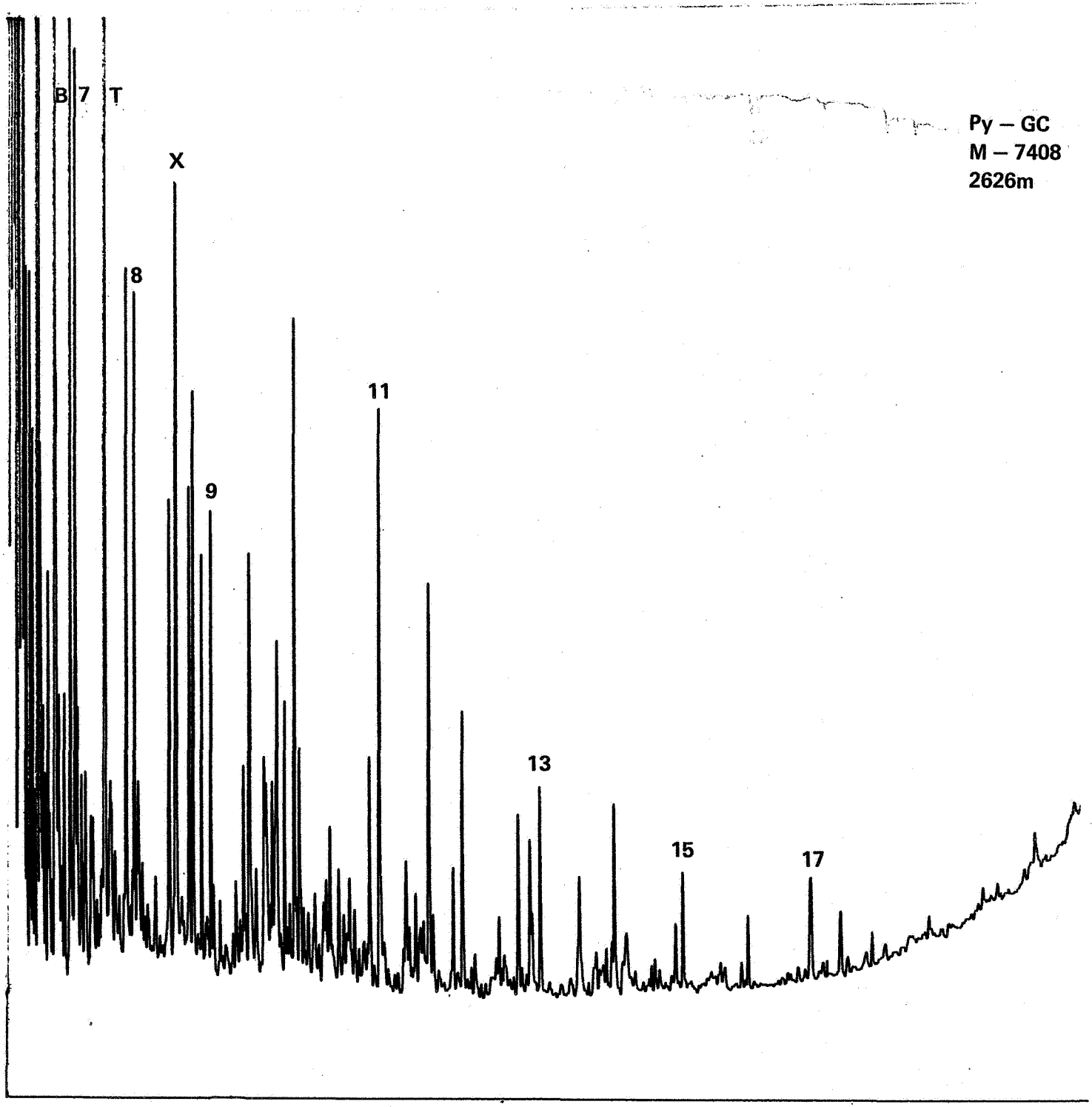

B
T
7
8
X
9
11
13
15
17
19
Py – GC
M – 7368
2240m

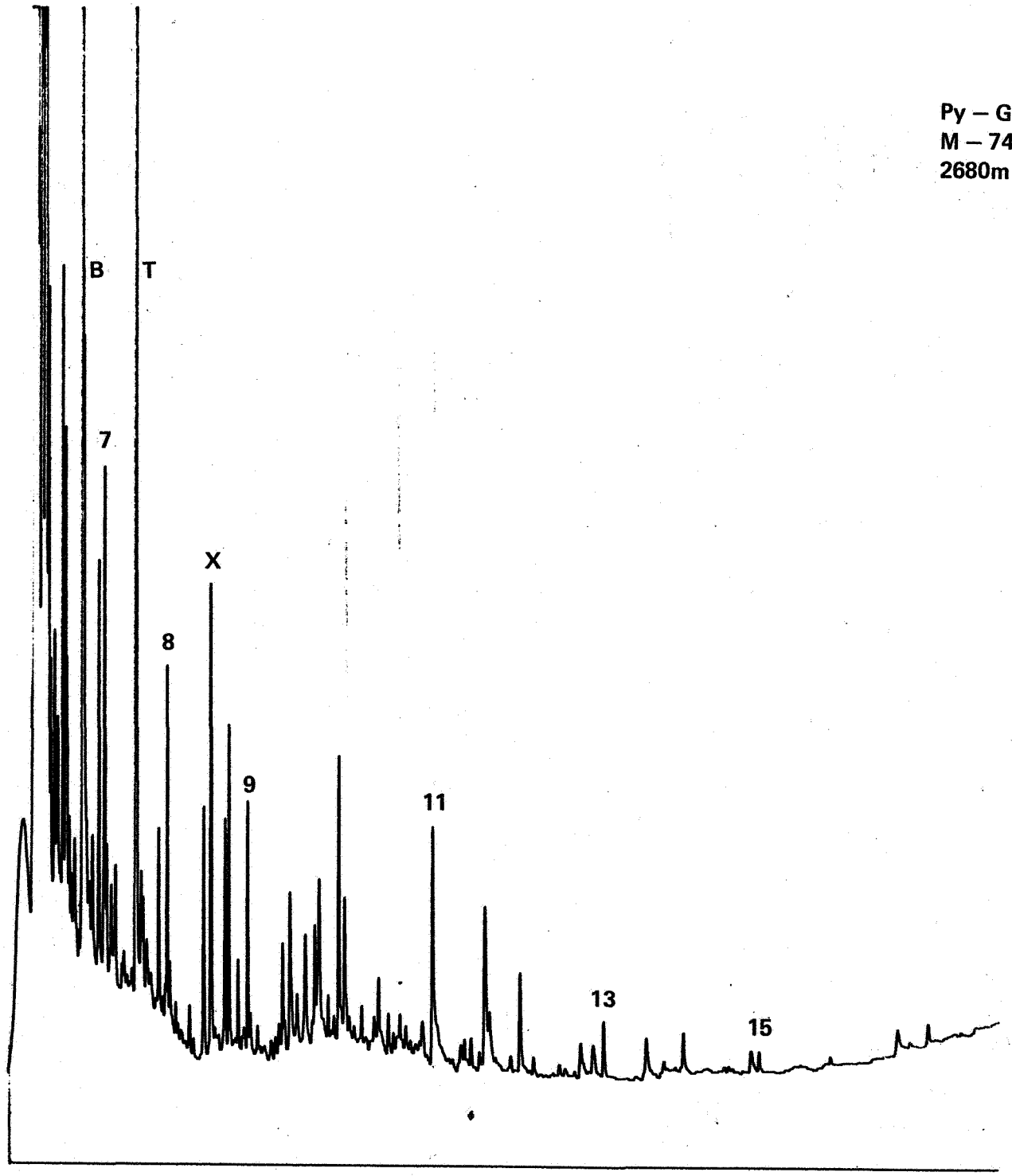

B
7
T
8
X
9
11
13
15
17
19
Py – GC
M – 7376
2320m

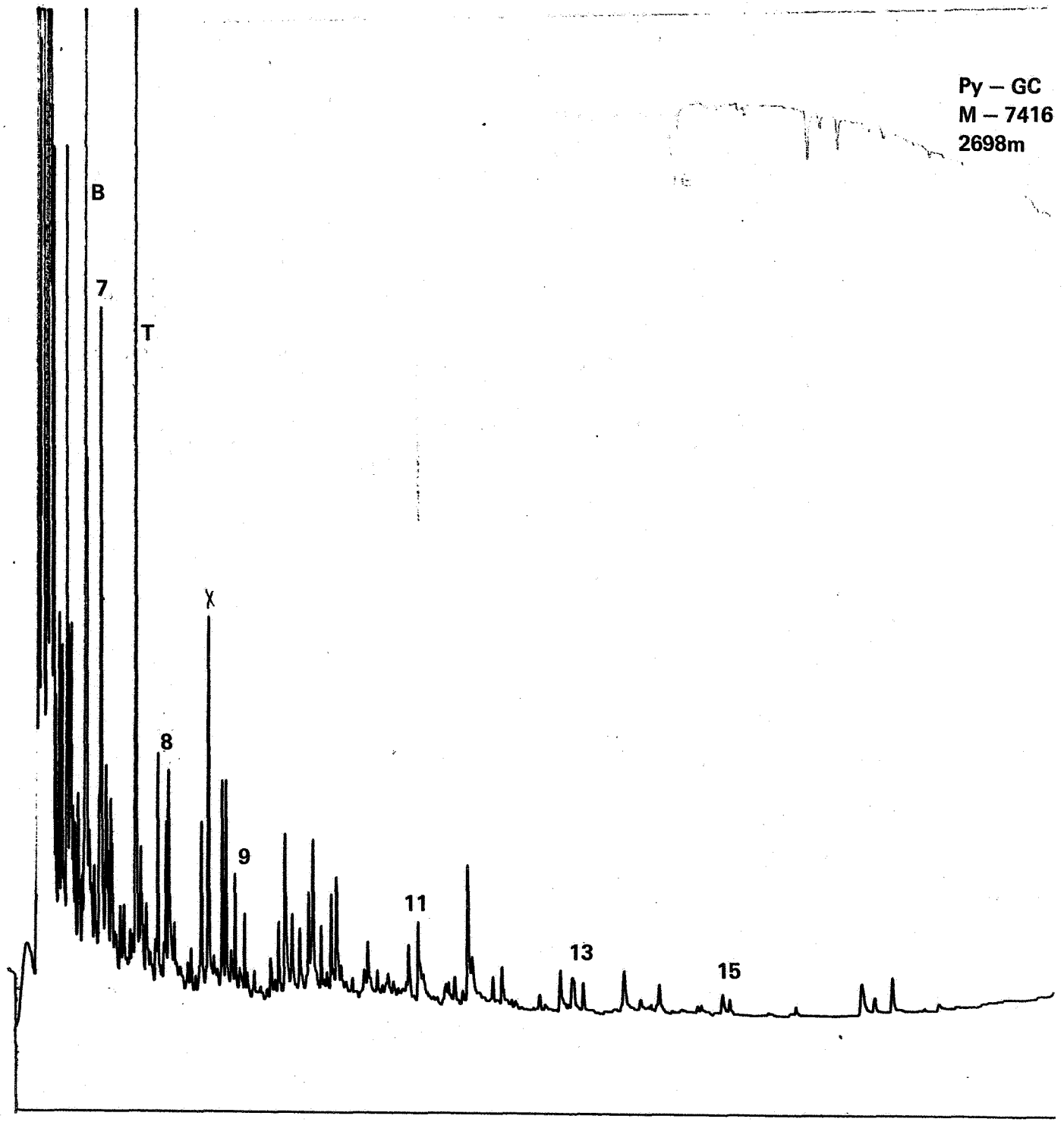

Py – GC
M – 7384
2400m
B
7
T
8
X
9
11
13
15
17
19

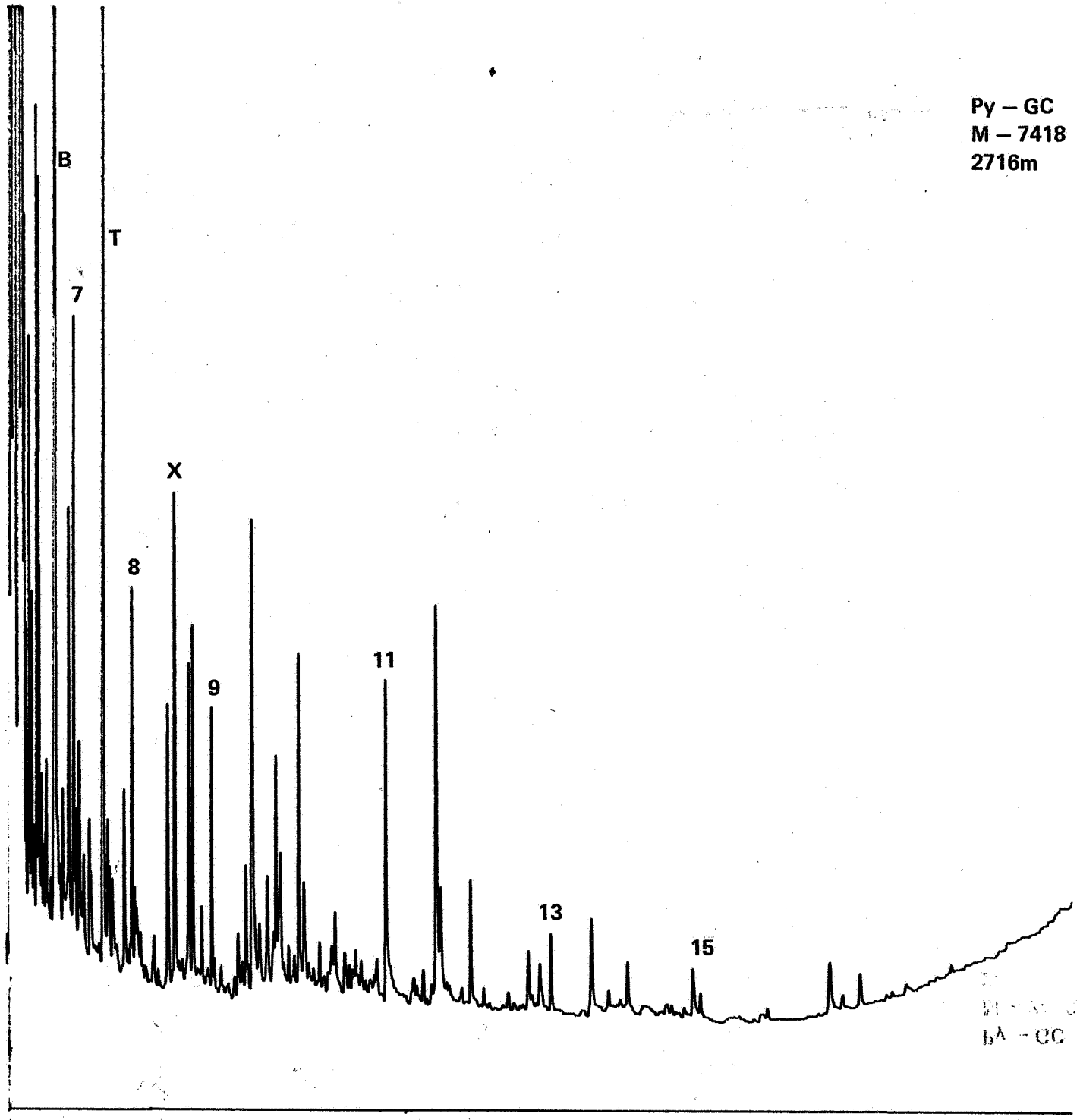

Py – GC
M – 7392
2480m
B
T
7
8
X
9
11
13
15
17
19

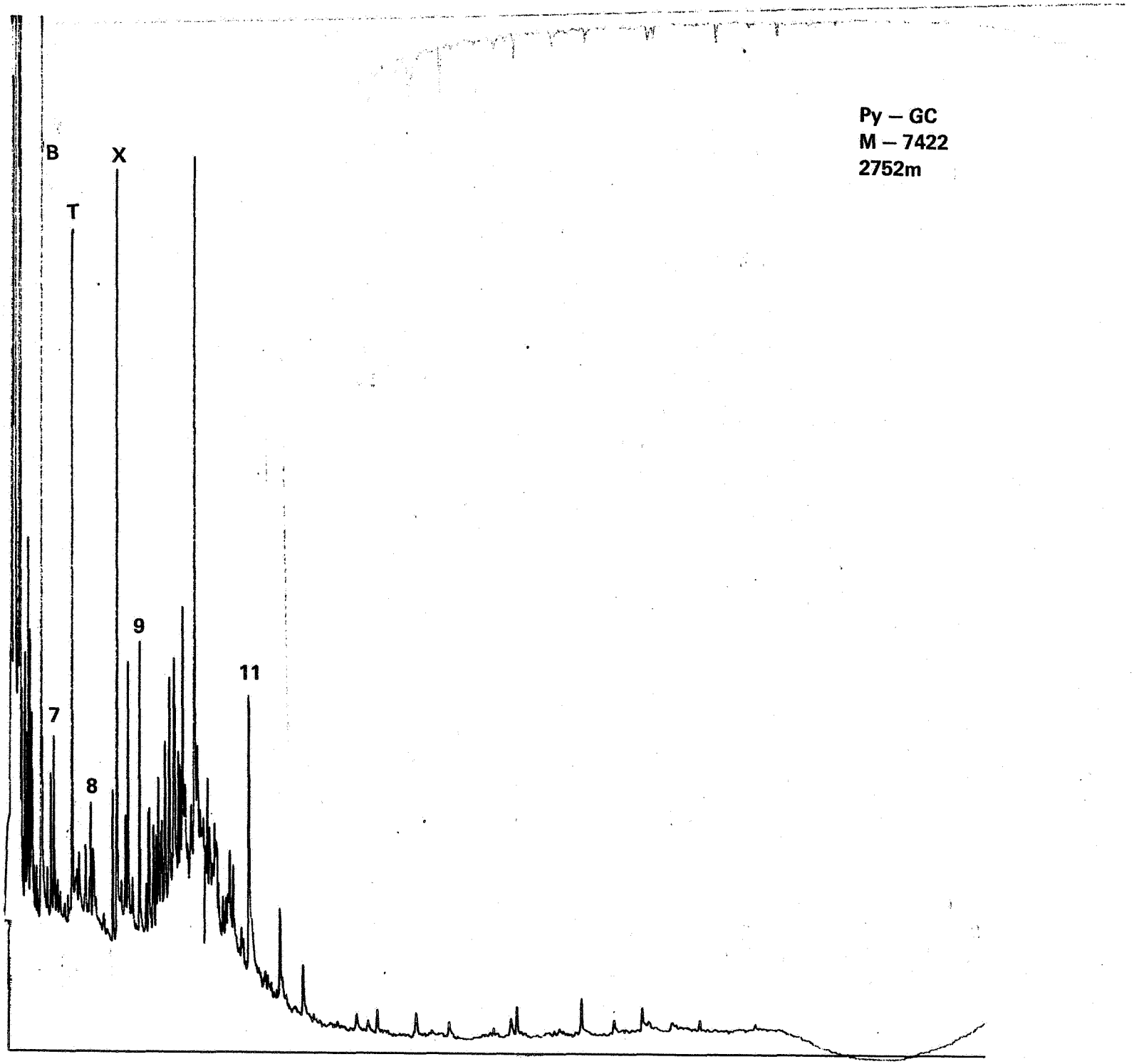

Py – GC
M – 7400
2554m
B
T
7
8
X
9
11
13
15
17
19
21

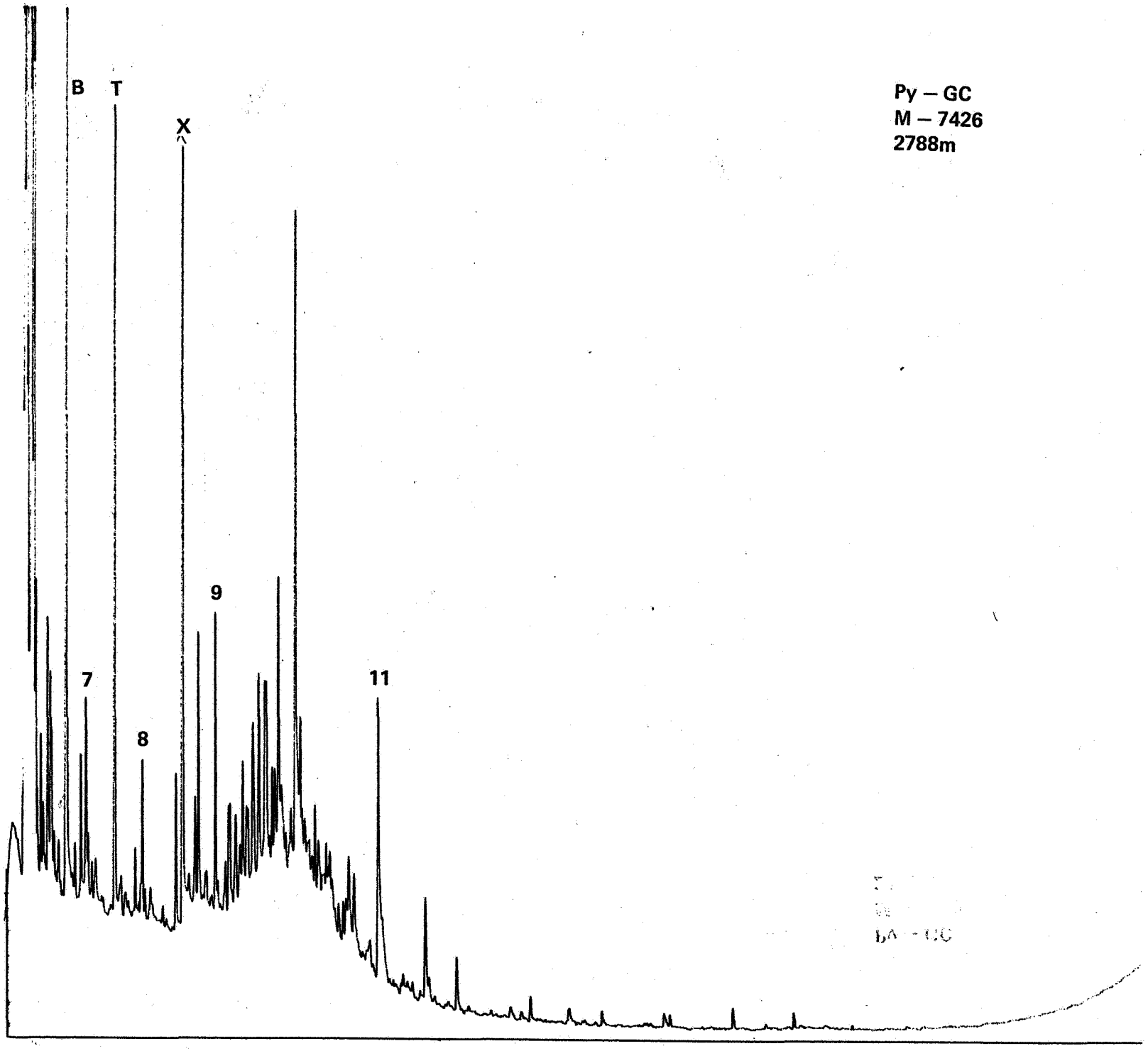

B
7
T
X
8
9
11
13
15
17
Py – GC
M – 7408
2626m

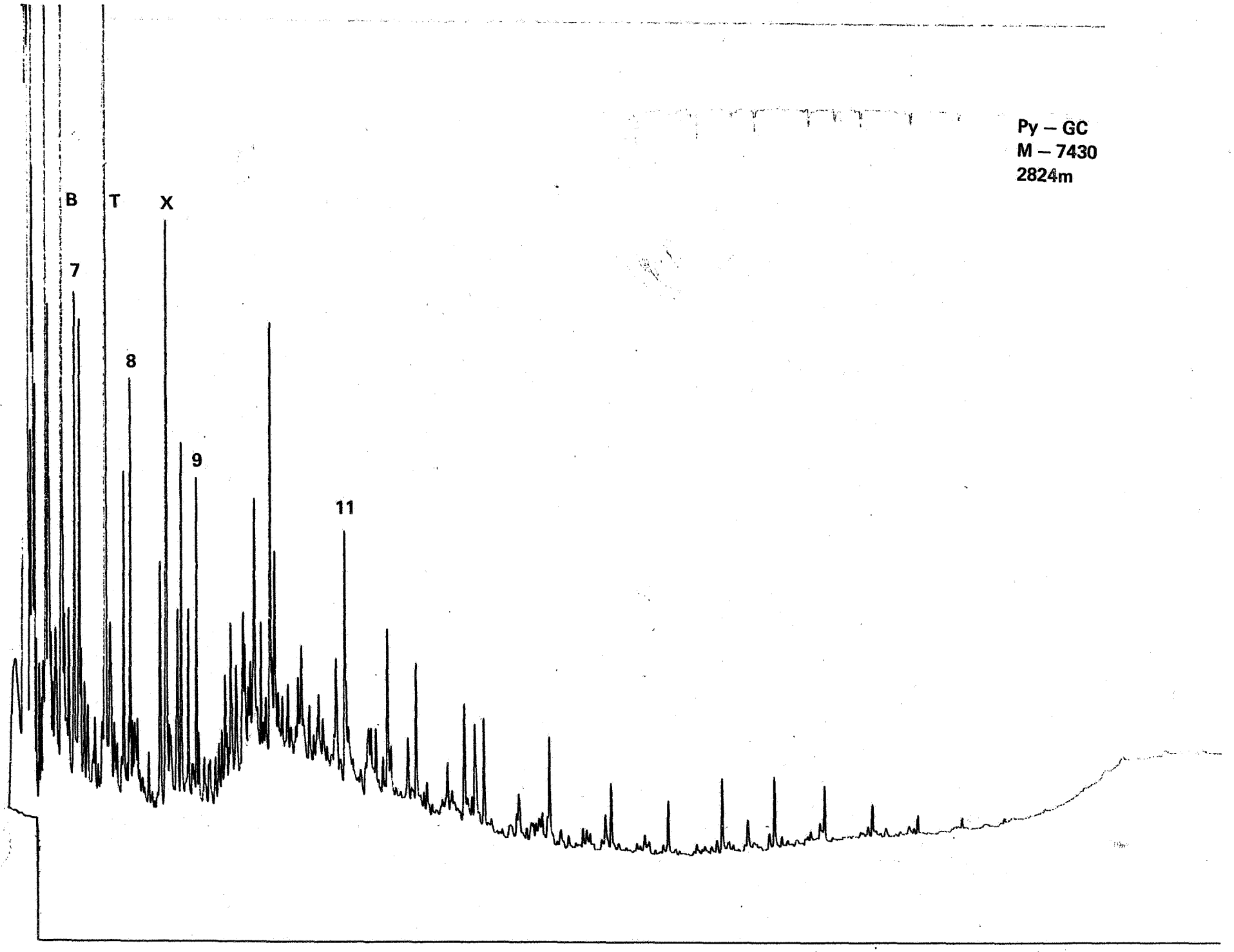

Py – GC
M – 7414
2680m
B
T
7
X
8
9
11
13
15

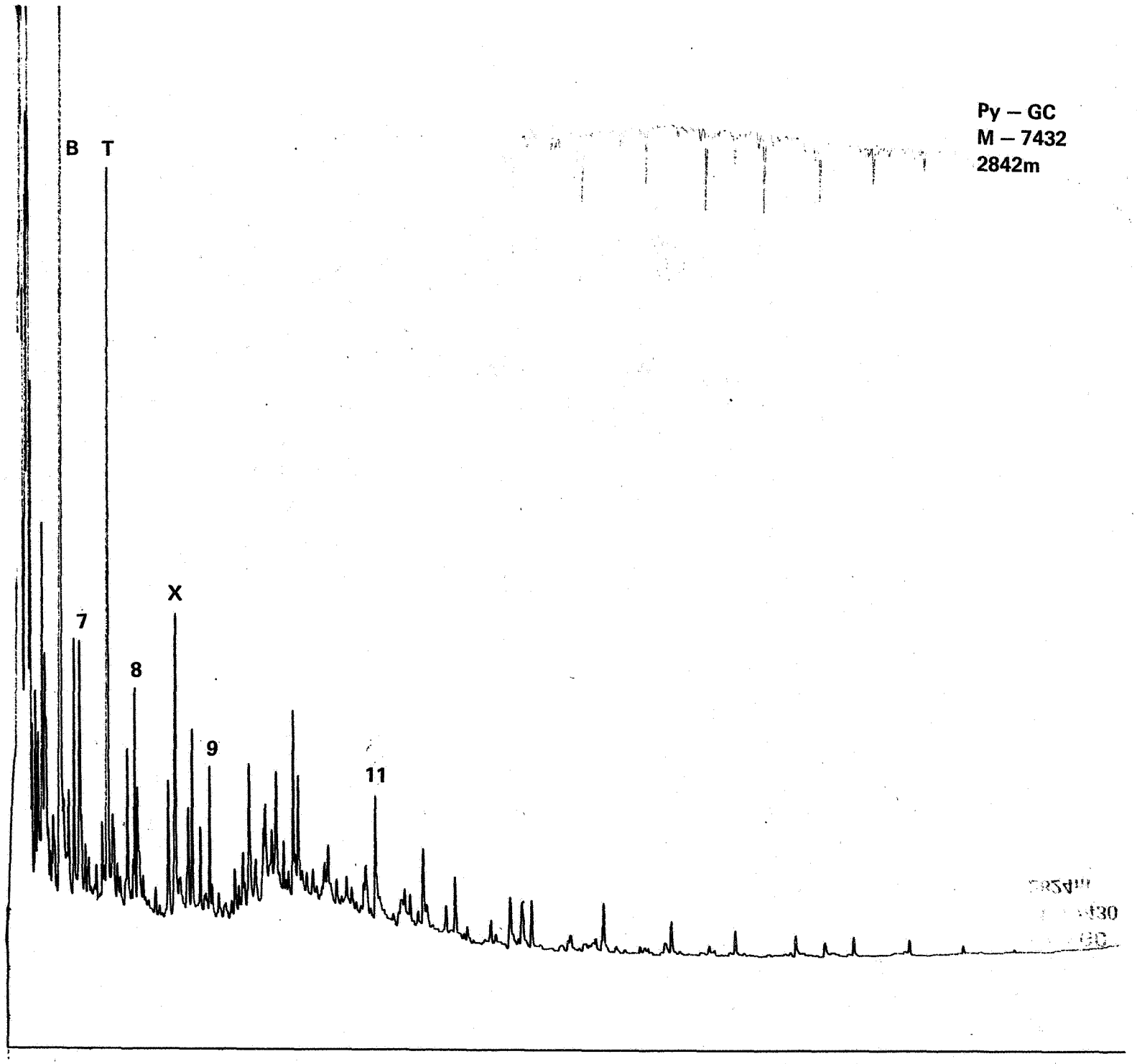

Py – GC
M – 7416
2698m
B
7
T
X
8
9
11
13
15

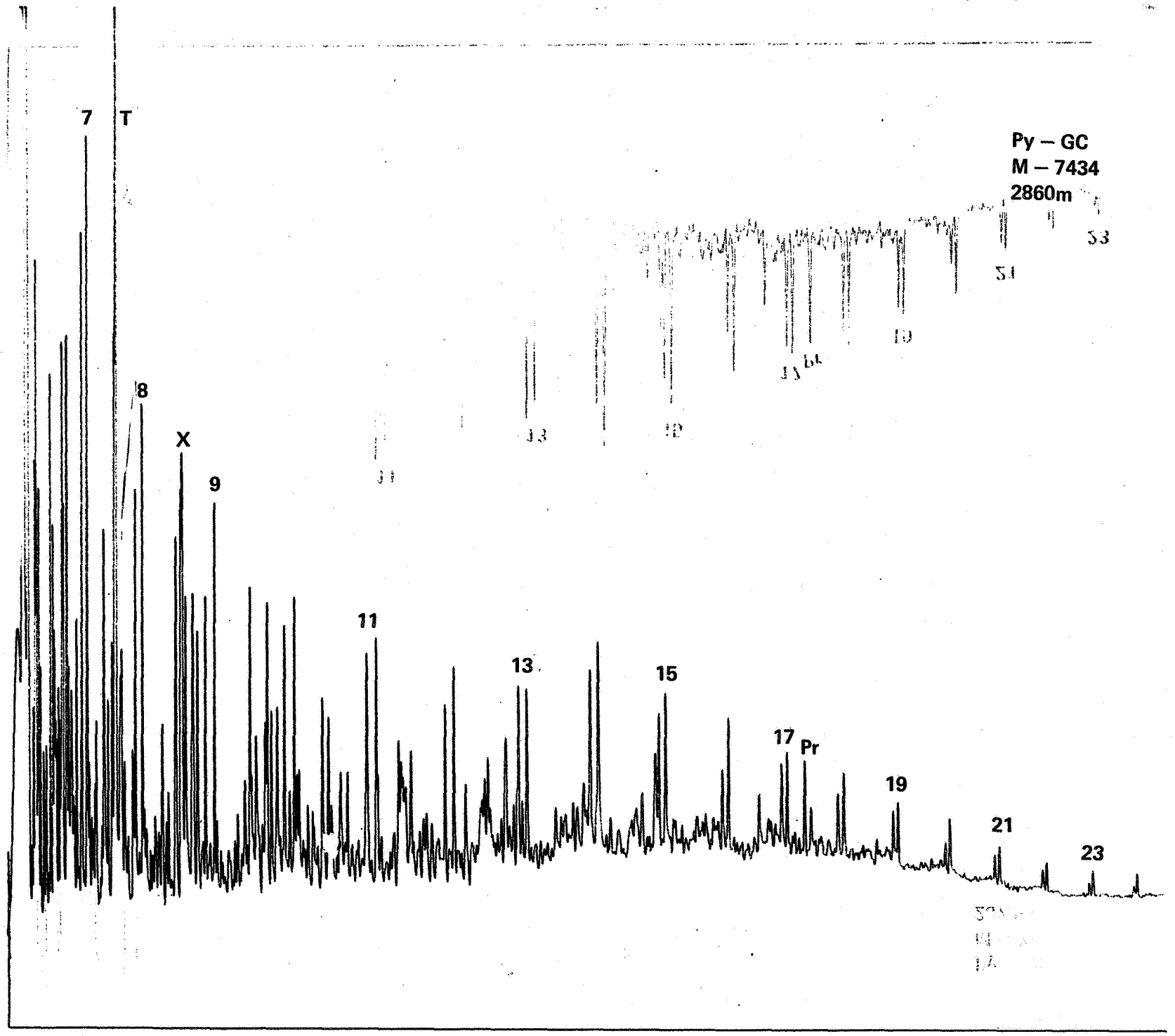

Py – GC
M – 7418
2716m
B
T
7
X
8
9
11
13
15

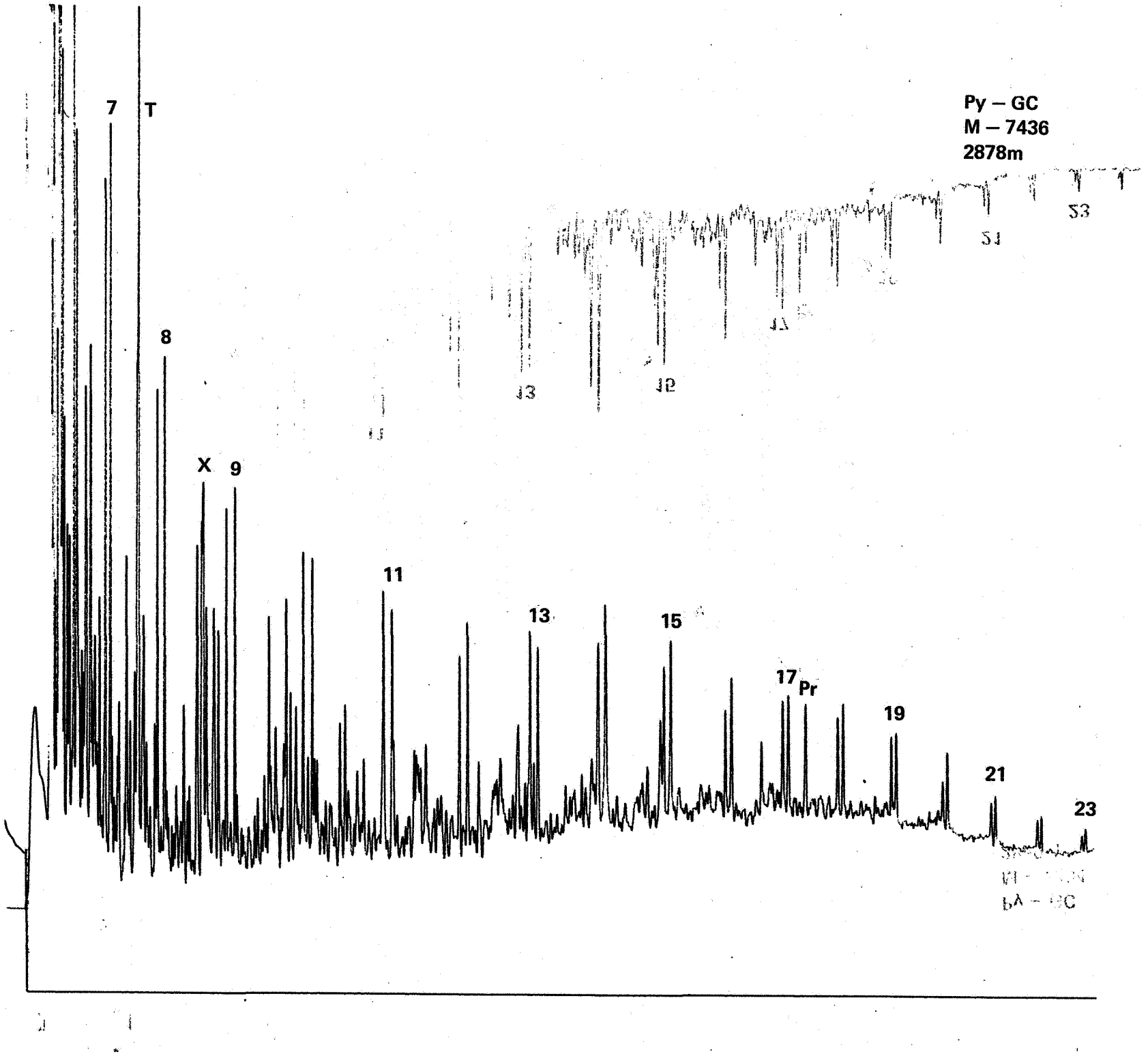

Py – GC
M – 7422
2752m
B
T
X
7
8
9
11

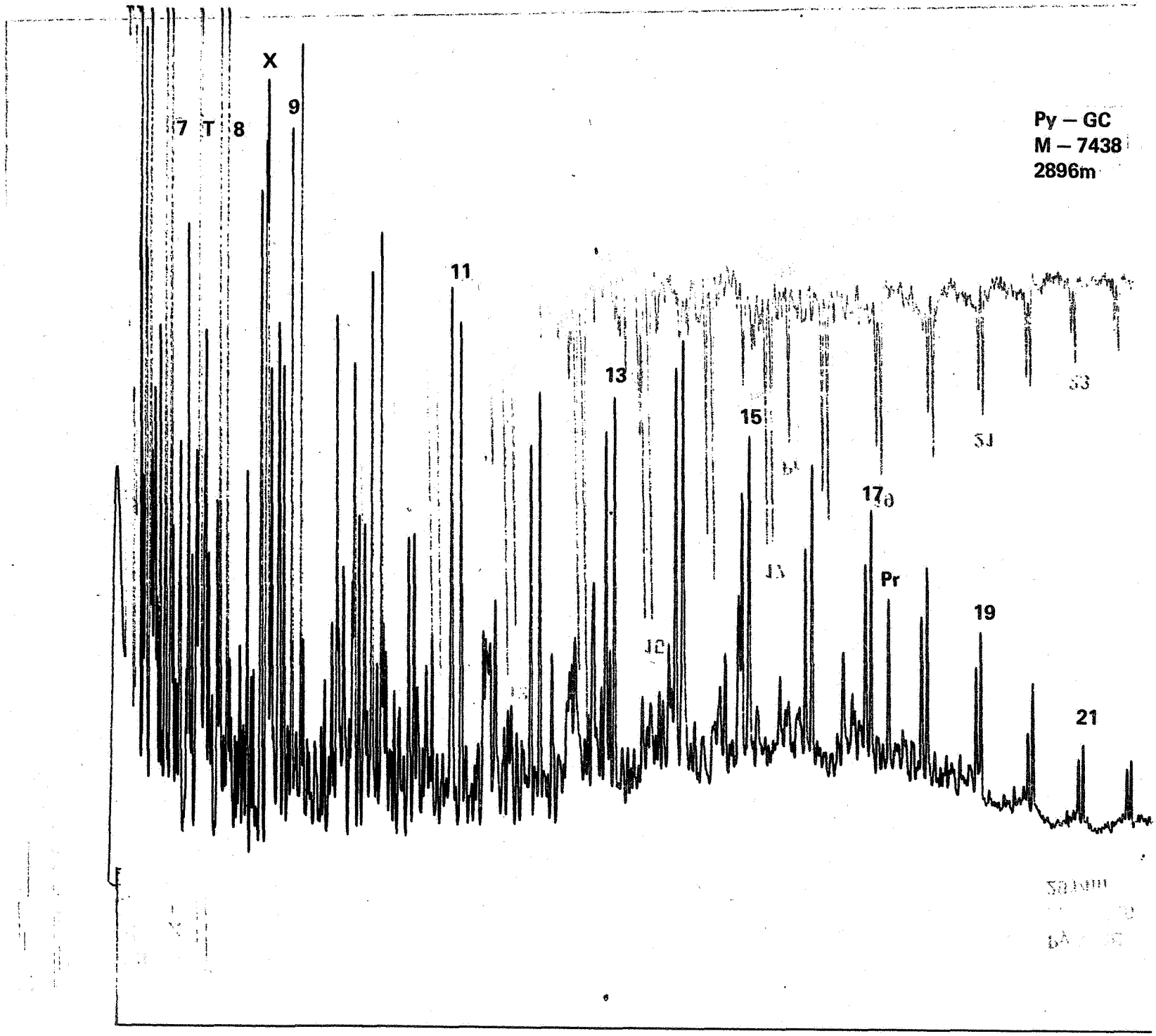

B
T
X
7
8
9
11
Py – GC
M – 7426
2788m

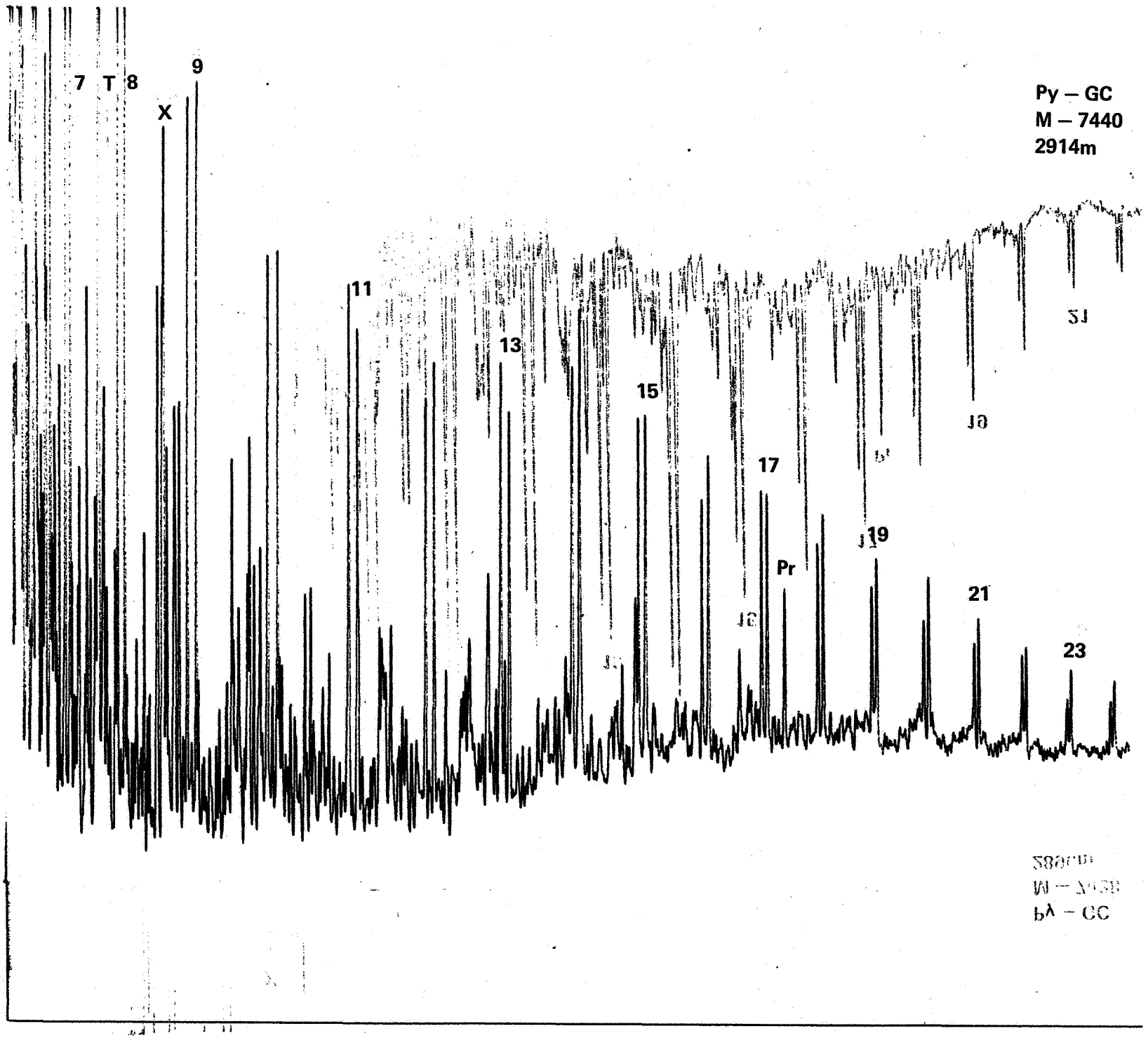

Py – GC
M – 7430
2824m
B
T
X
7
8
9
11

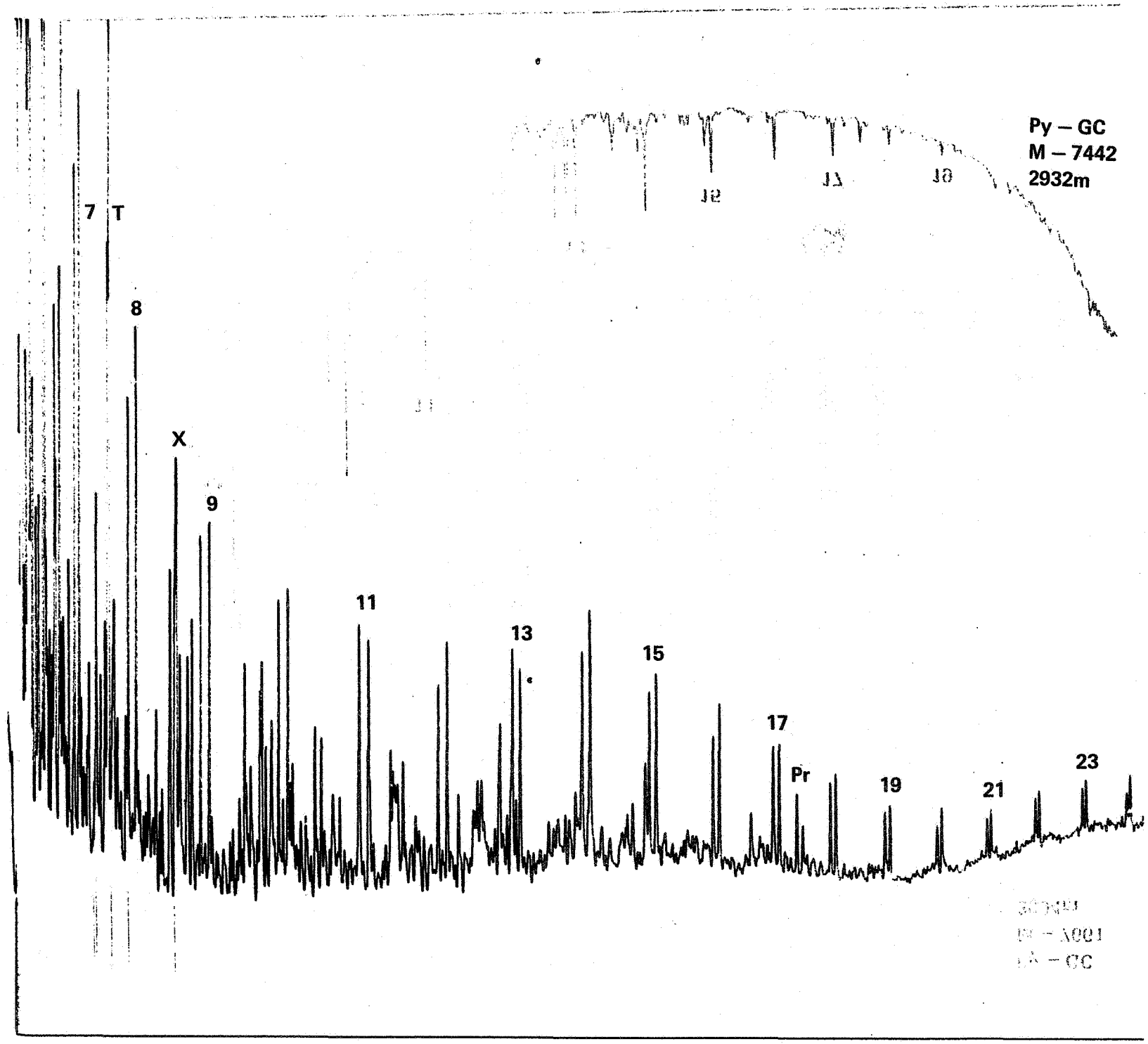

Py – GC
M – 7432
2842m
B
T
7
8
X
9
11

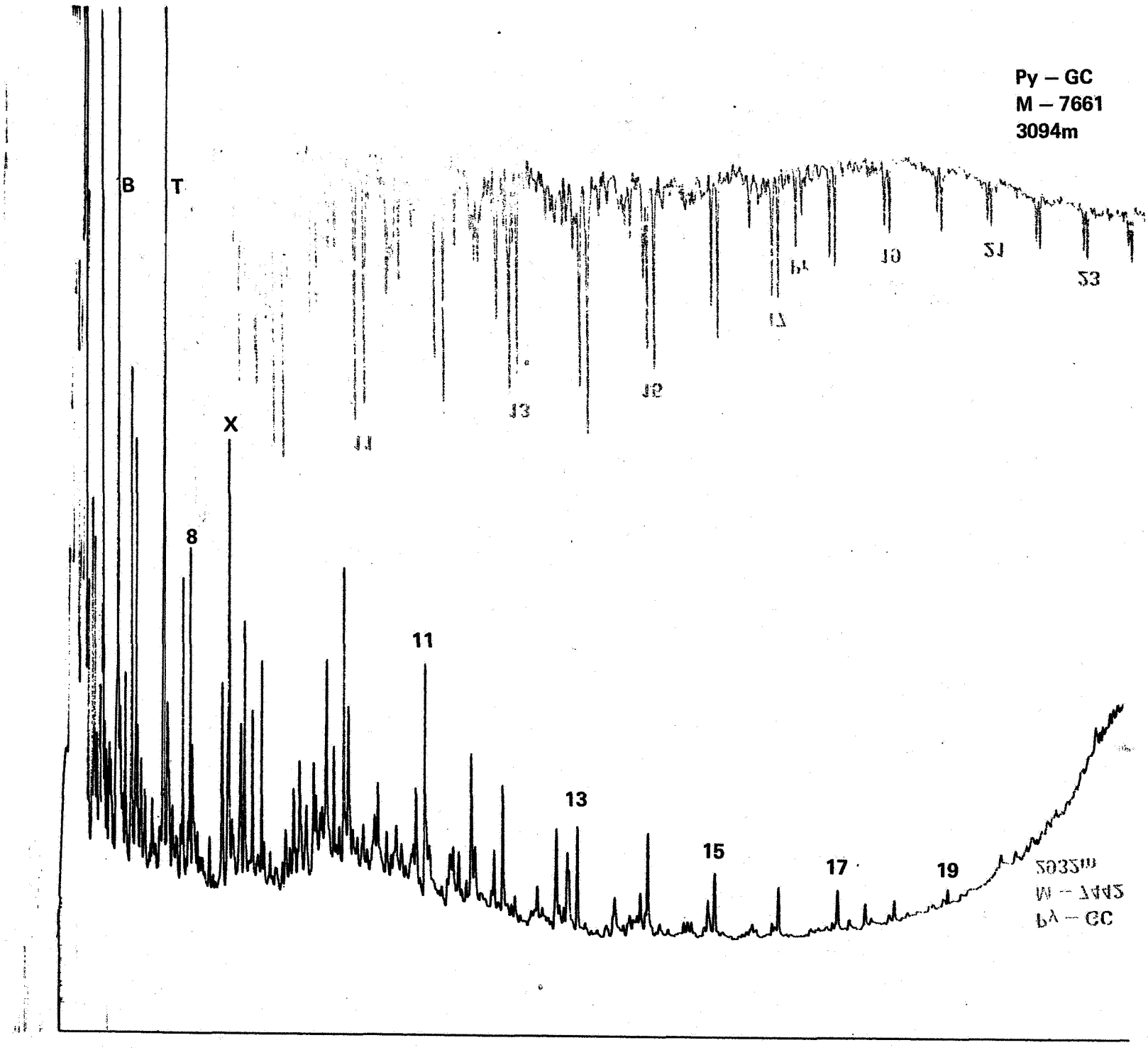

Py – GC
M – 7434
2860m
7
T
8
X
9
11
13
15
17
Pr
19
21
23

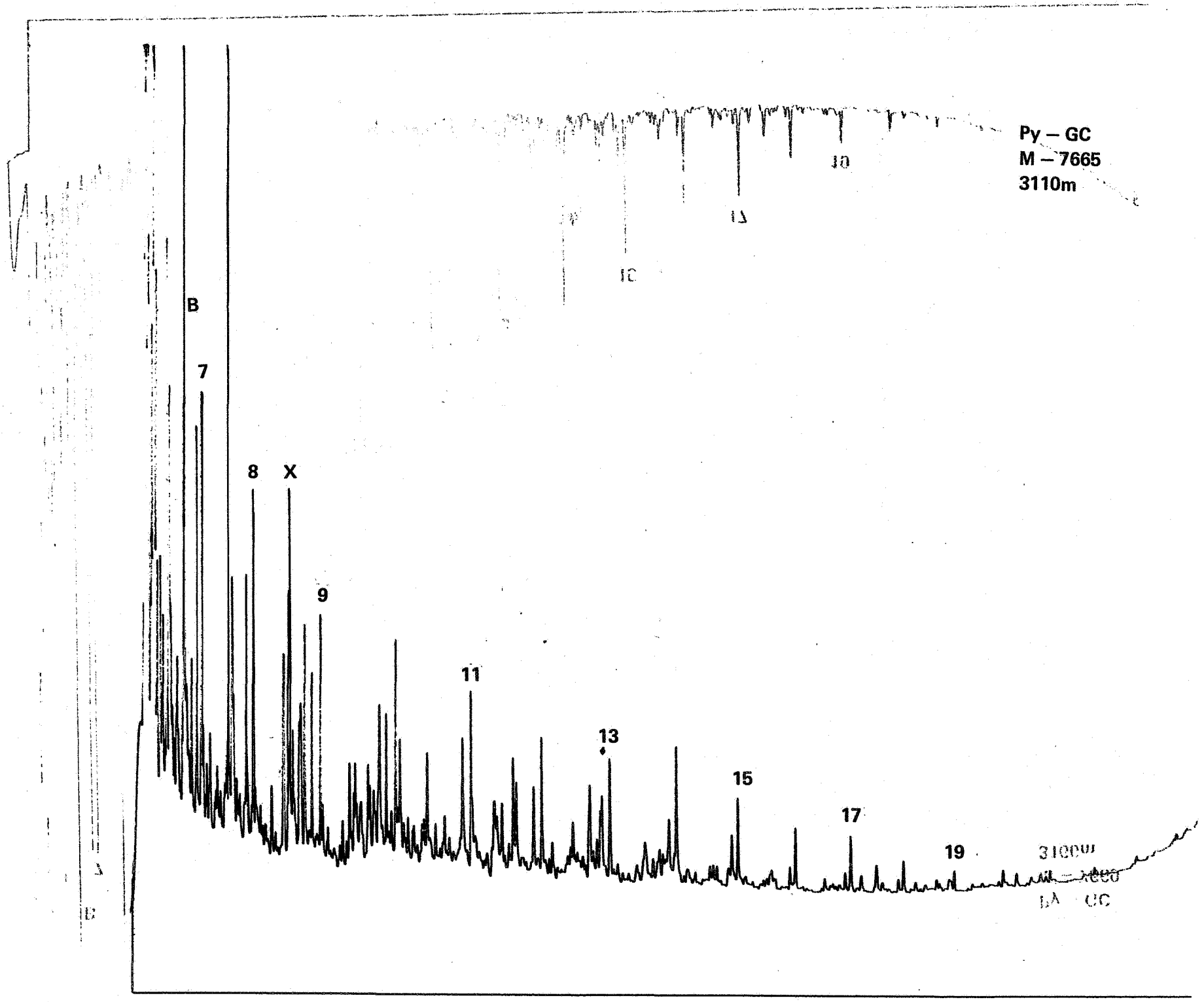

Py – GC
M – 7436
2878m
7
T
8
X
9
11
13
15
17
Pr
19
21
23

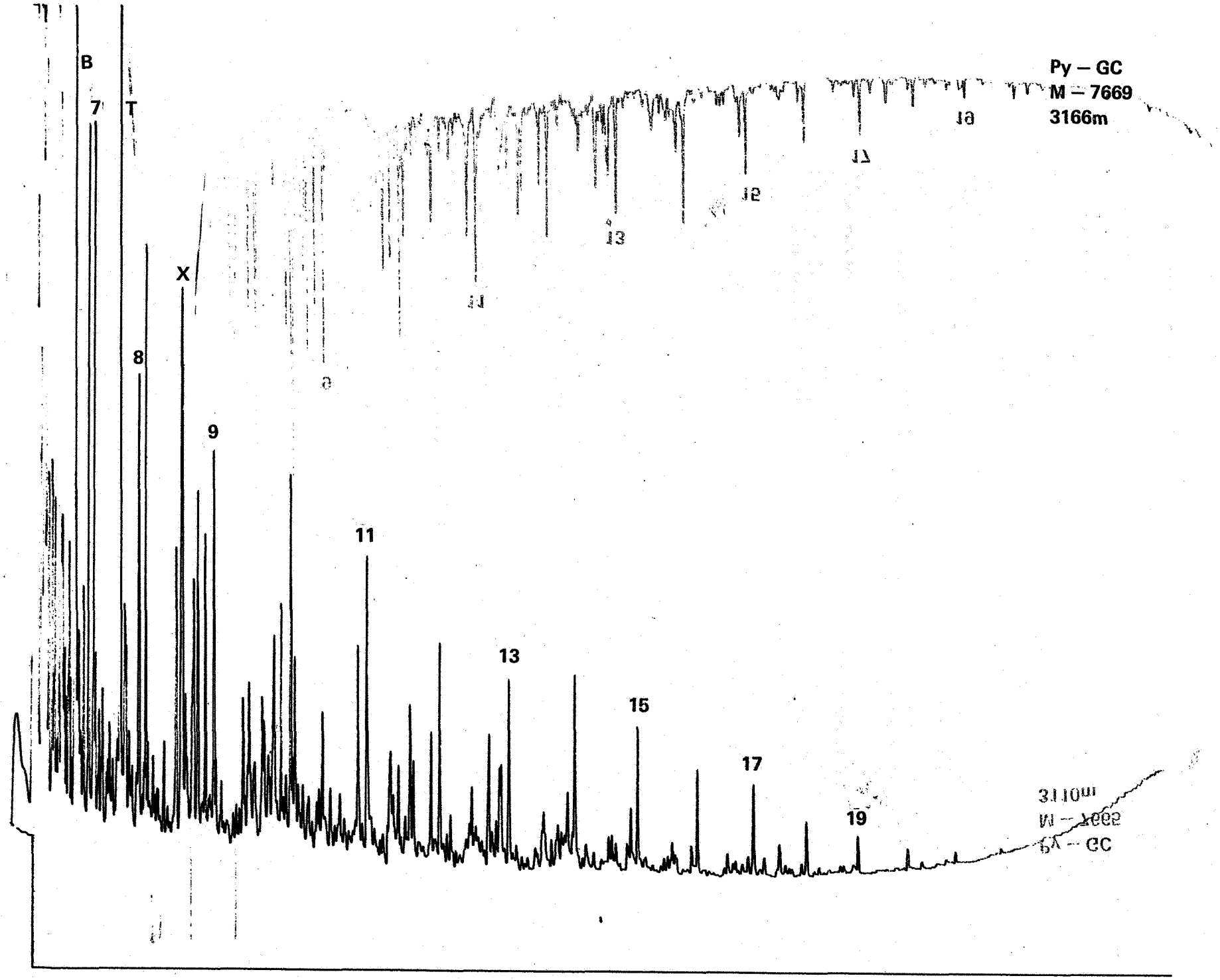

Py – GC
M – 7438
2896m
7
T
8
X
9
11
13
15
Pr
19
21

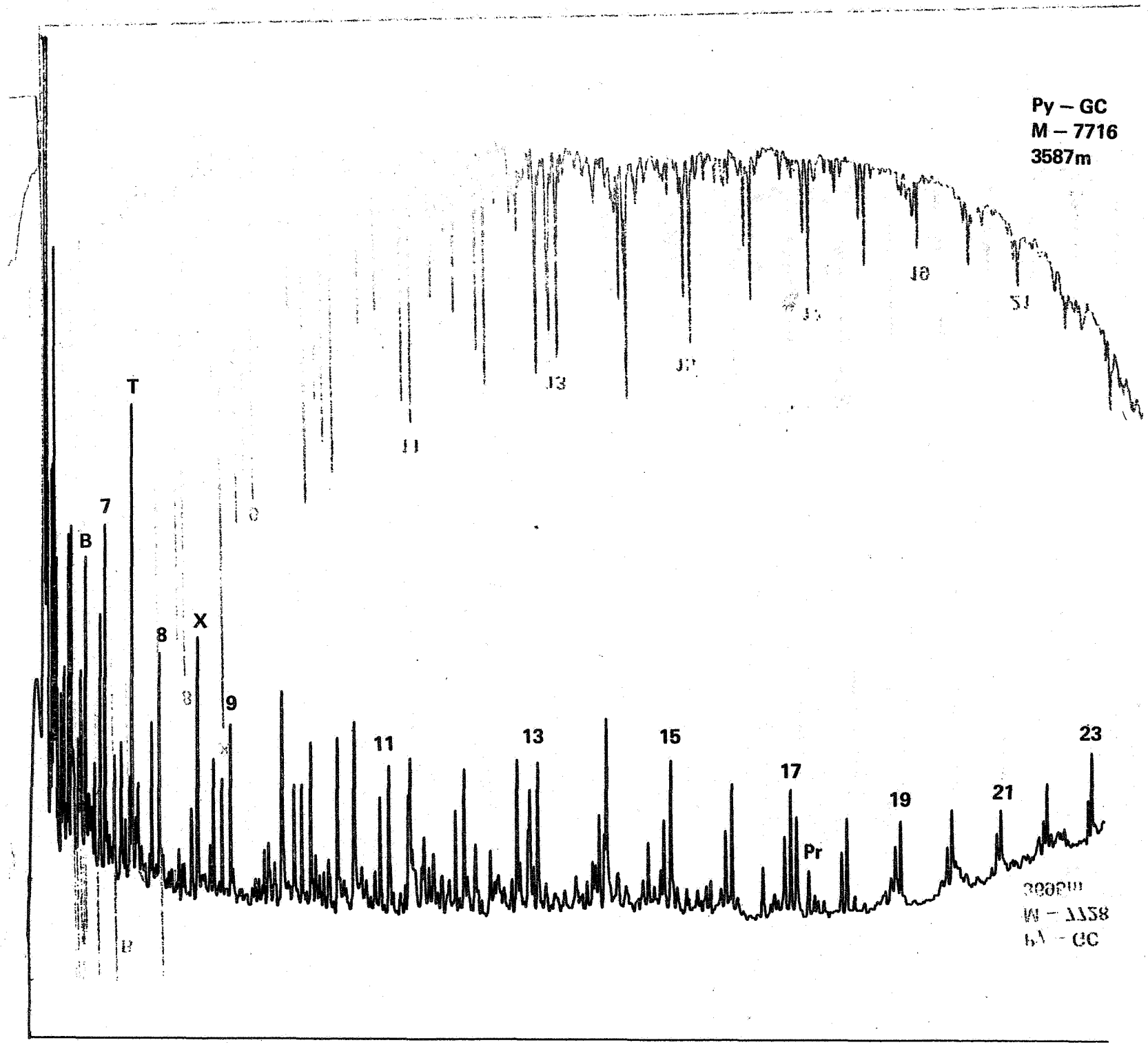

7
T
8
X
9
11
13
15
17
Pr
19
21
23
Py – GC
M – 7440
2914m

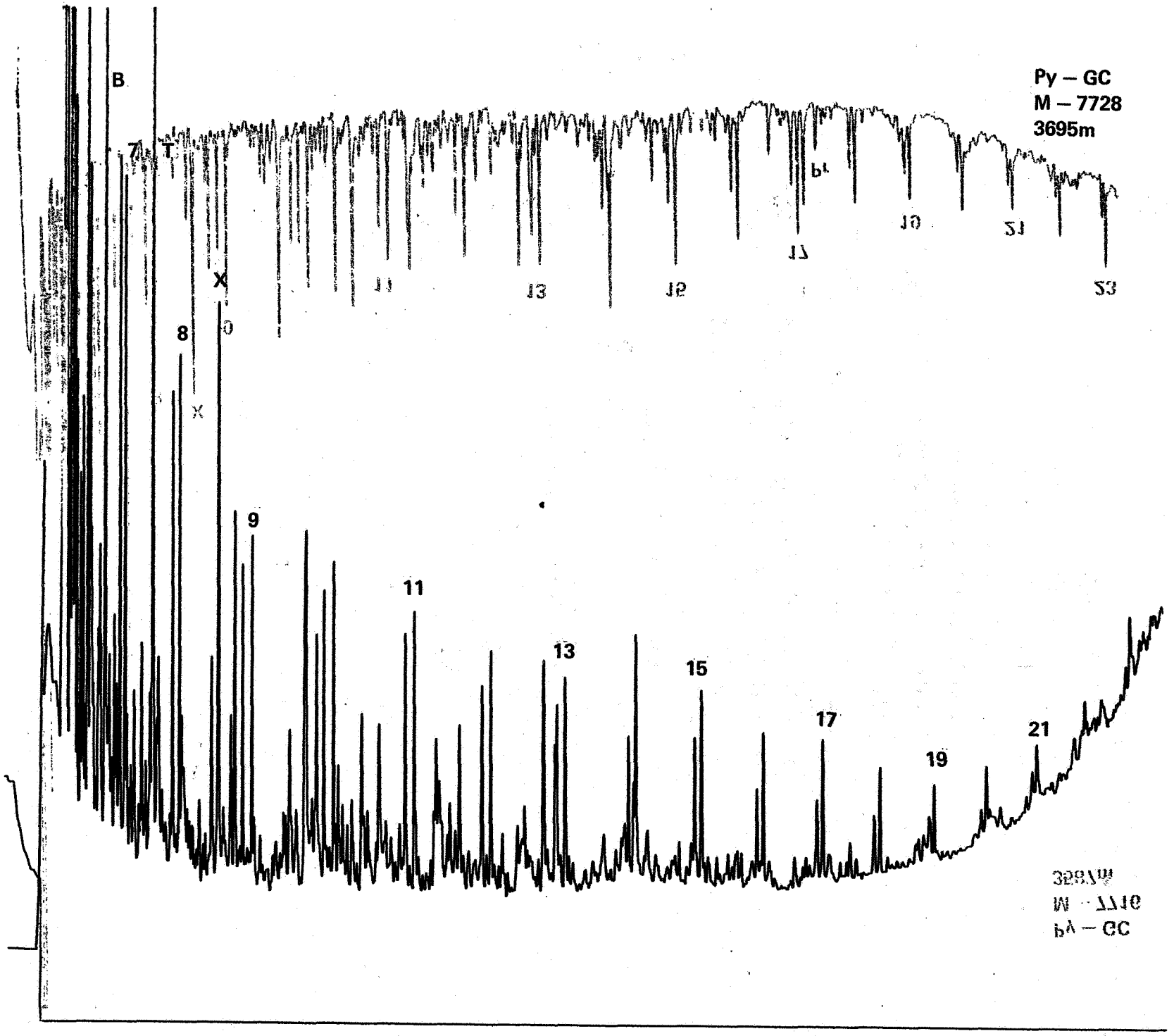

Py – GC
M – 7442
2932m
7
T
8
X
9
11
13
15
17
Pr
19
21
23


Py – GC
M – 7661
3094m
B
T
X
8
11
13
15
17
19


Py – GC
M – 7665
3110m
B
7
8
X
9
11
13
15
17
19


Py – GC
M – 7669
3166m
B
7
T
X
8
9
11
13
15
17
19


Py – GC
M – 7716
3587m
T
B
7
8
X
9
11
13
15
17
Pr
19
21
23


Py – GC
M – 7728
3695m
B
T
X
8
9
11
13
15
17
19
21

GC-MS CHROMATOGRAMS

Triterpanes m/e 191

C = 17α(H), 21β(H) - norhopane ($\alpha\beta$-C_{29})
D = 17α(H), 21β(H) - norhopane ($\alpha\beta$-C_{29})
E = 17α(H), 21β(H) - hopane ($\alpha\beta$-C_{30})
F = 17β(H), 21α(H) - hopane ($\beta\alpha$-C_{30})
G = 17α(H), 21β(H) - homohopane, 22S ($\alpha\beta$-C_{31})
H = 17α(H), 21β(H) - homohopane, 22R ($\alpha\beta$-C_{31})
Z = C_{28} - triterpane

Steranes m/e 217

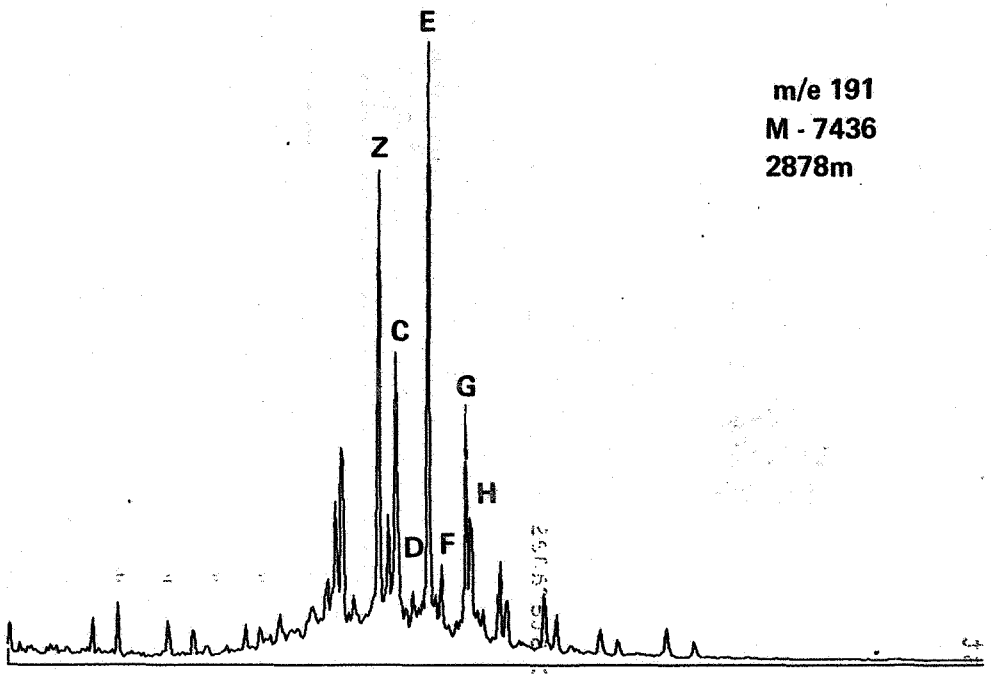
q = 14α(H), 17α(H) - C_{29} - sterane, 20S
r,s = 14β(H), 17β(H) - C_{29} - steranes, 20S + 20R
t = 14α(H), 17α(H) - C_{29} - sterane, 20R
* = Rearranged steranes
x = probably 4-methyl steranes

Triaromatic steranes m/e 231

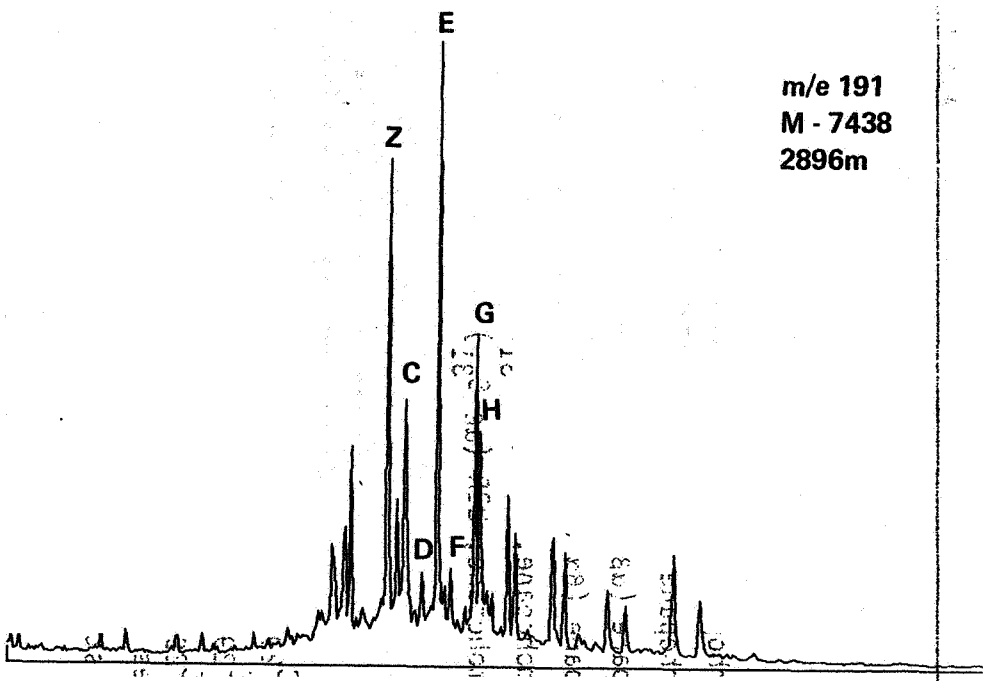
M = C_{20} triaromatic steranes
N = C_{21} " "
O = C_{26} " "
P = $C_{26}+C_{27}$ " "
Q = C_{28} " "
R = C_{27} " "
S = C_{28} " "

Monoaromatic steranes m/e 253

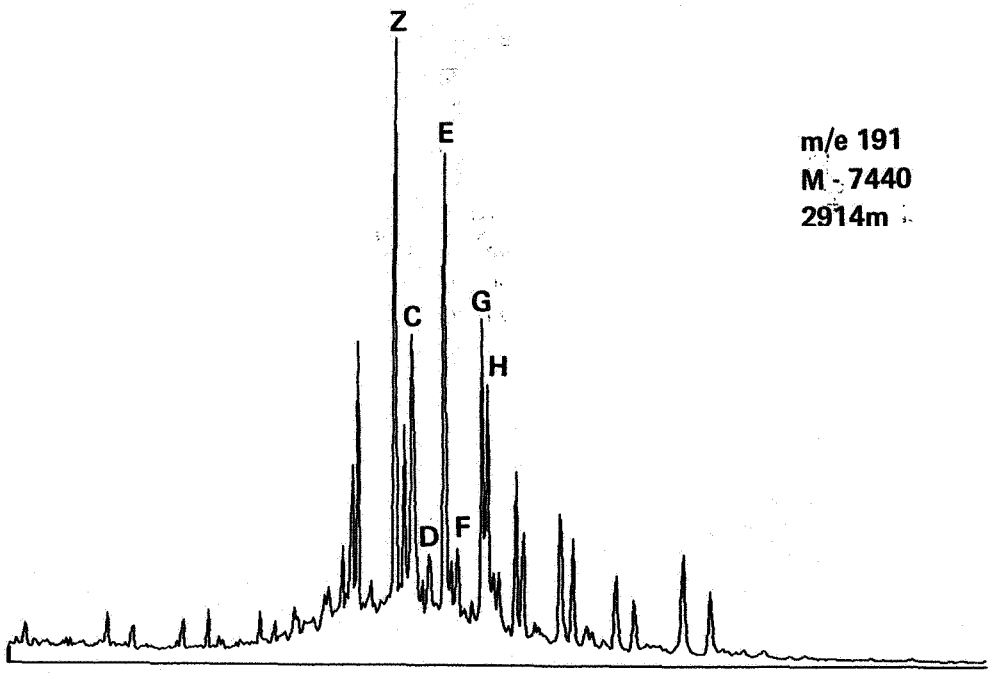
a = C_{21} monoaromatic steranes
b = C_{22} " "
c = unidentified
d = C_{27} " "
e = C_{27} " "
f = C_{28} " "
g = C_{27} " "
h = $C_{28}+C_{29}$ " "
i = C_{29} " "
j = C_{29} " "
k = unidentified
l = "



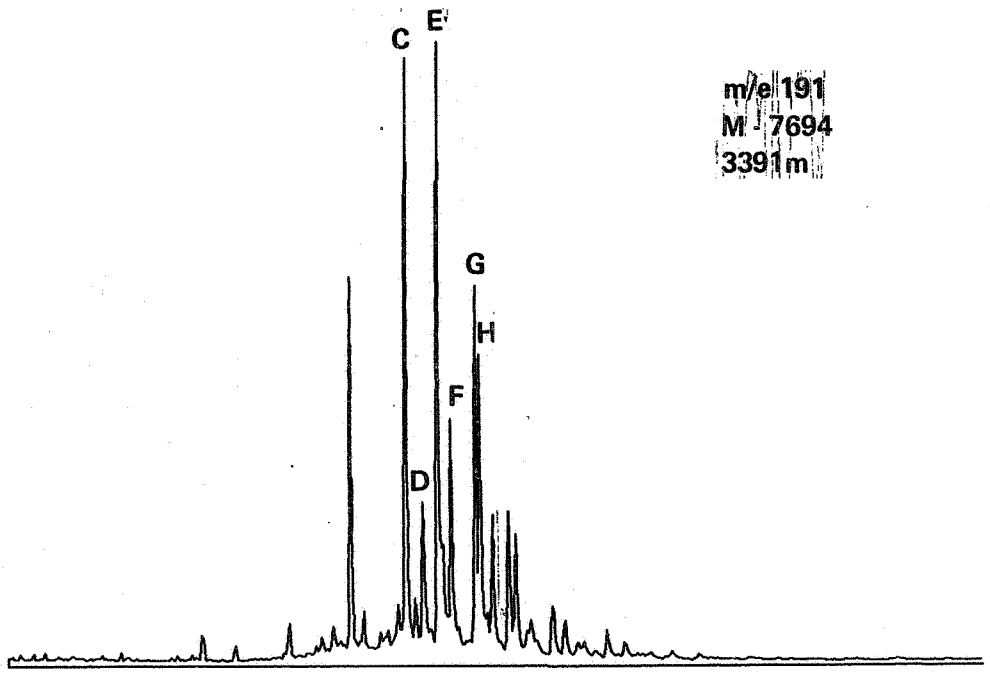
m/e 191
M - 7436
2878m

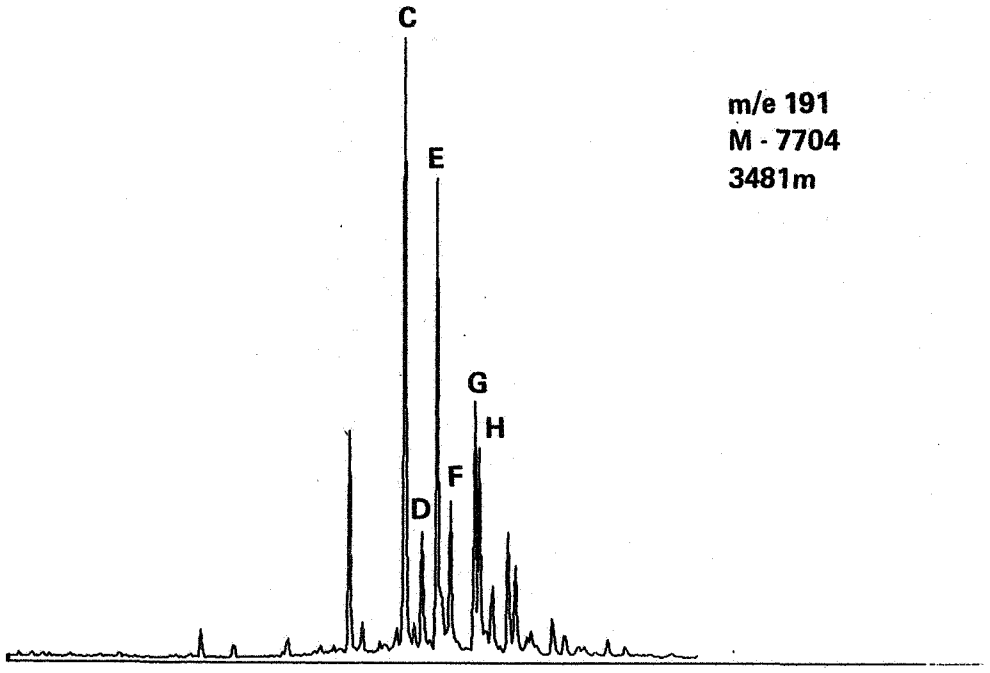


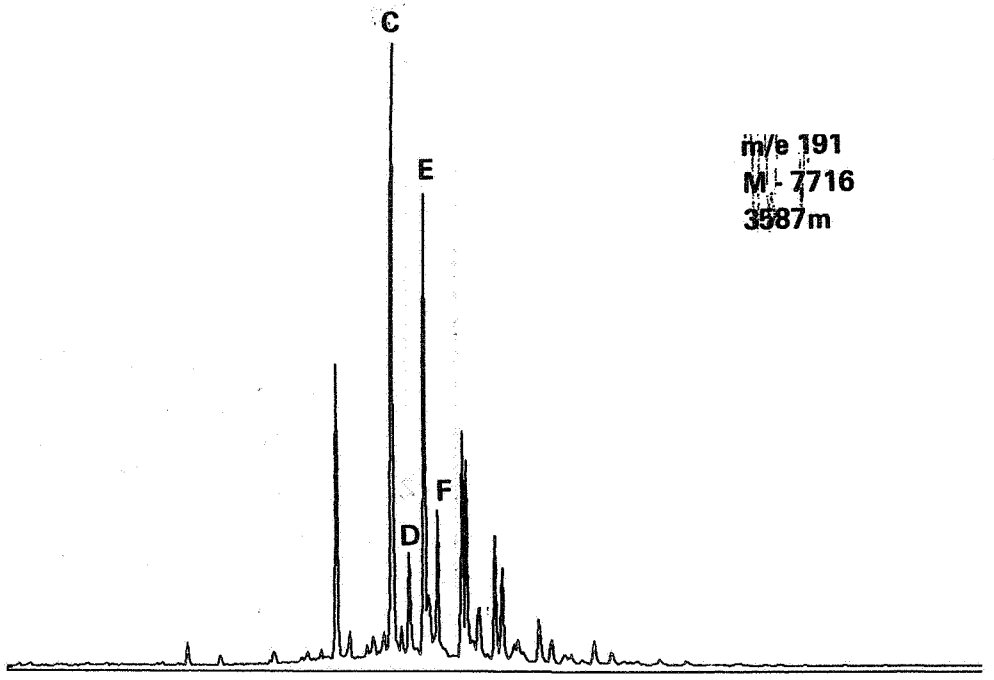
m/e 191
M - 7438
2896m

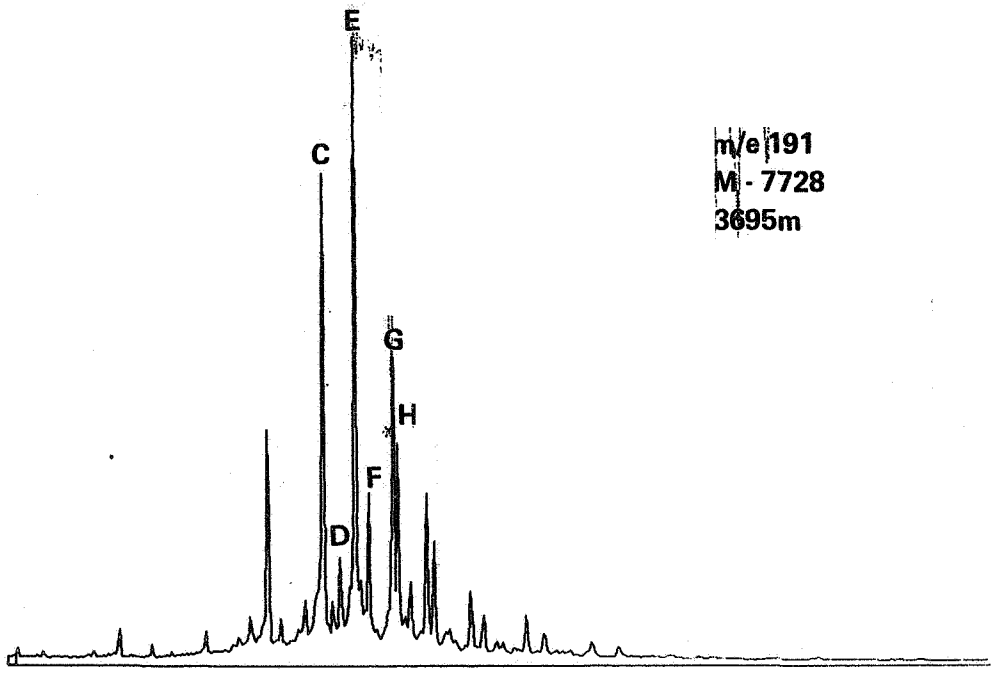


m/e 191
M - 7440
2914m


C
E
G
H
F
D
m/e 191
M - 7694
3391m


C
E
G
H
F
D
m/e 191
M - 7704
3481m


C
E
F
D
m/e 191
M - 7716
3587m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D
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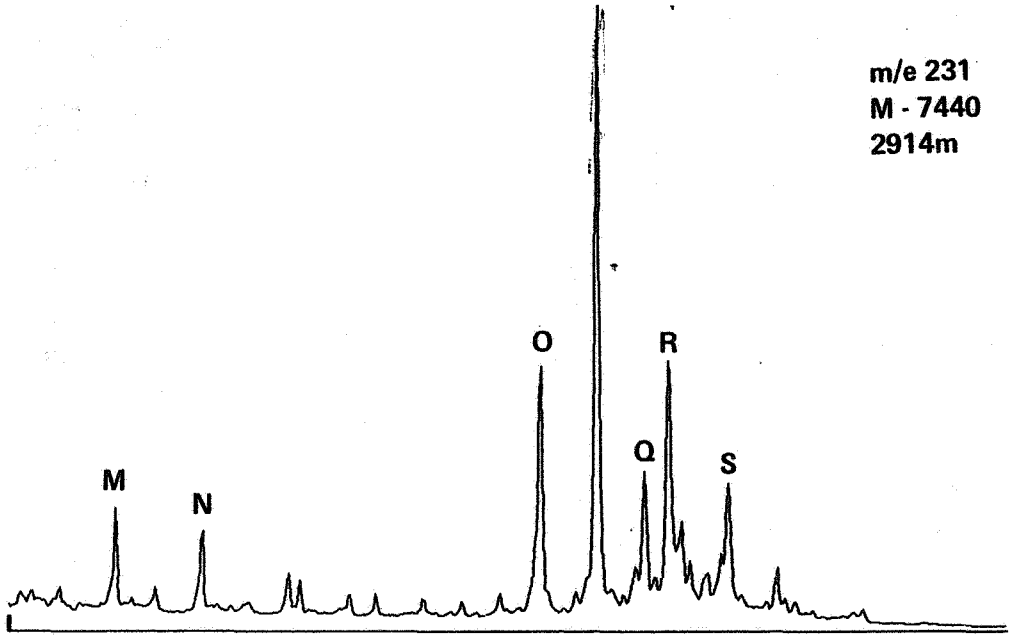
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2914m
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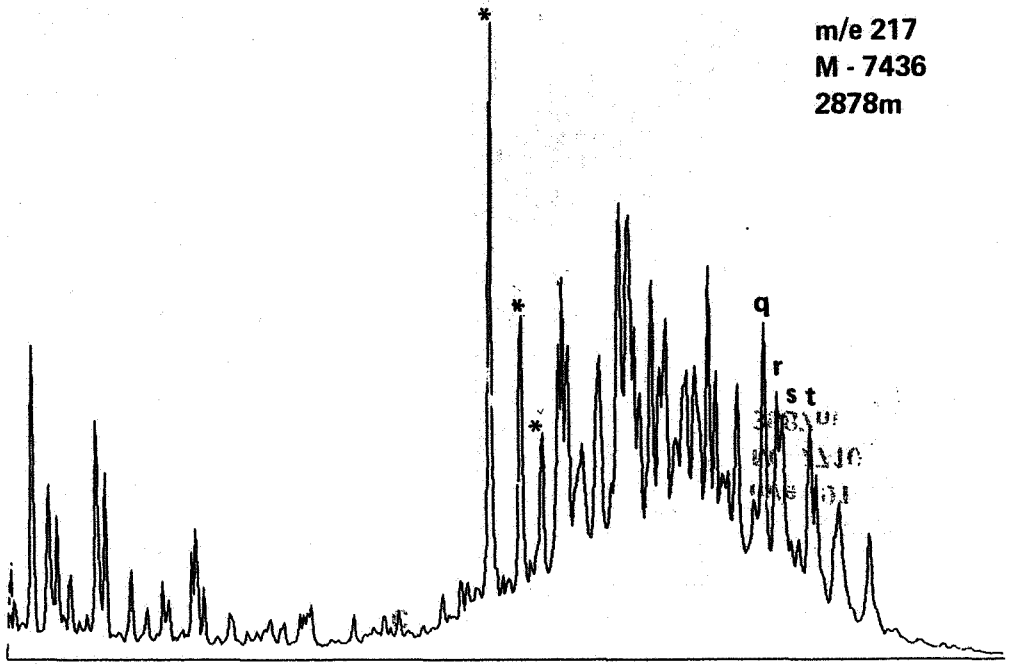
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2878m
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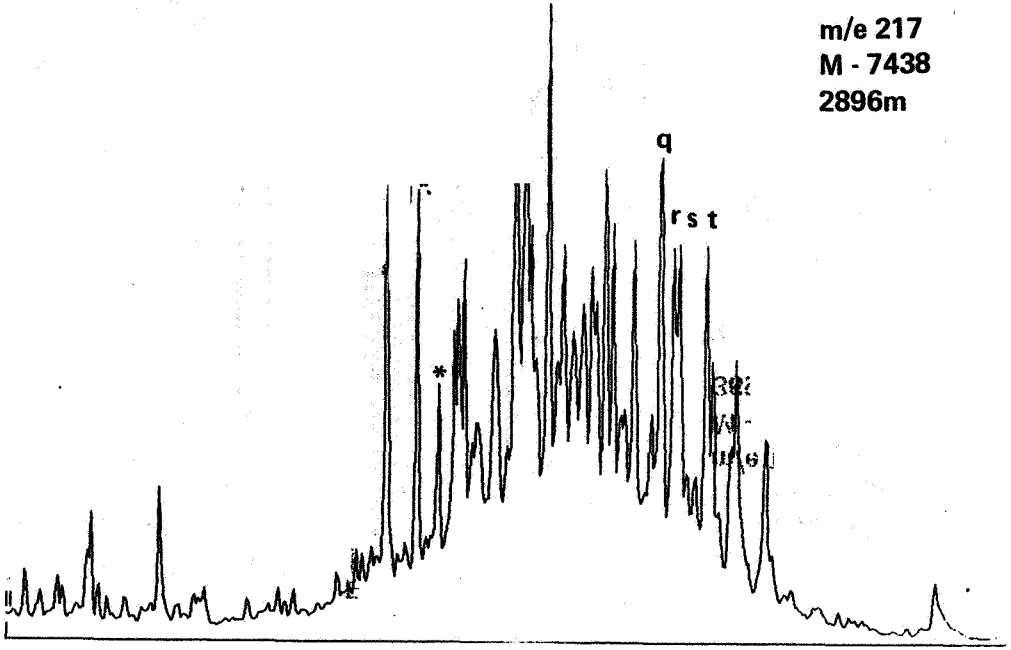
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2896m
q
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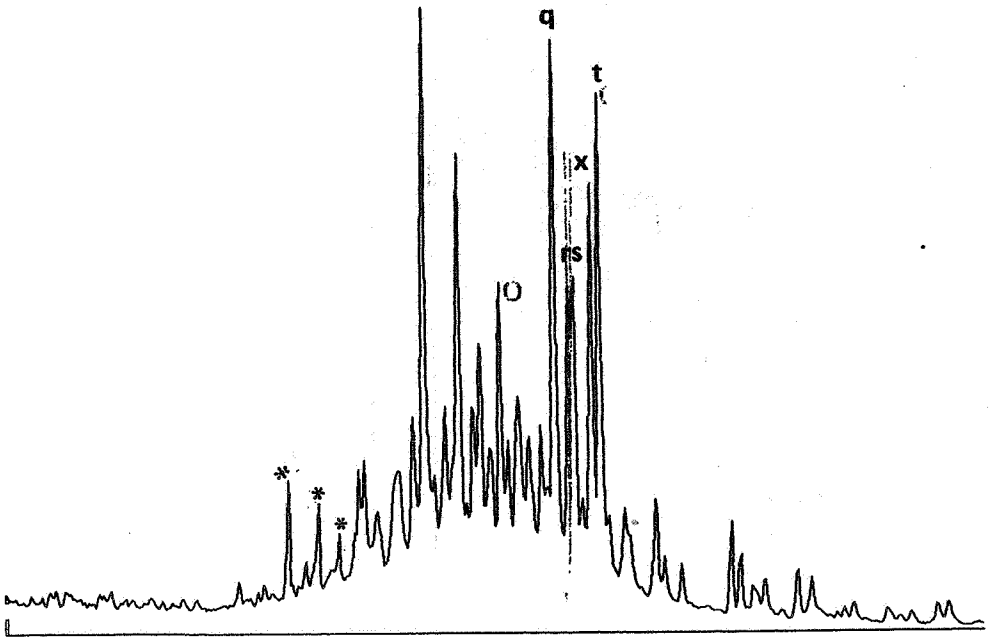
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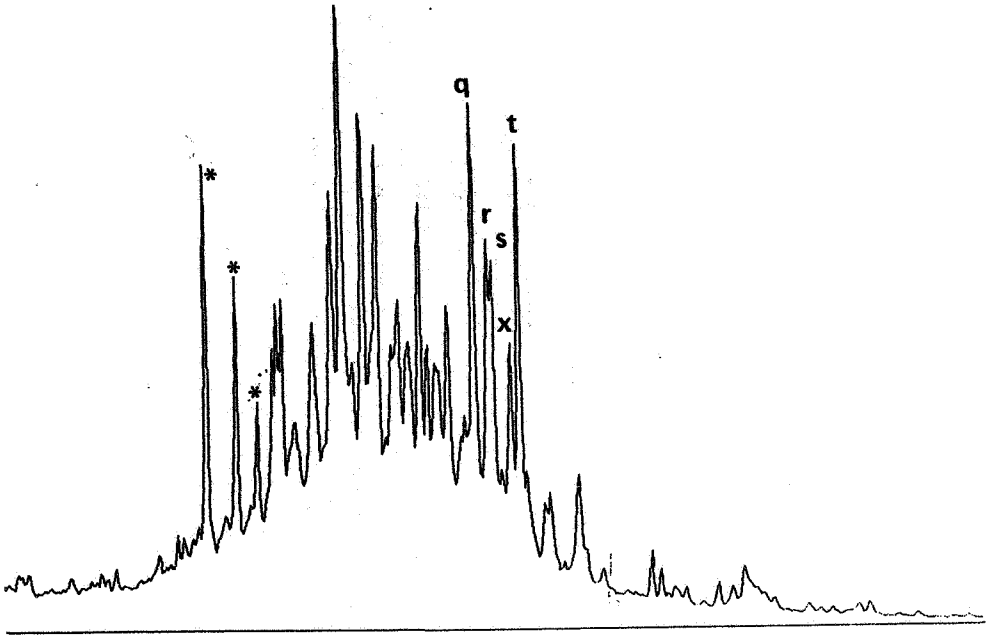
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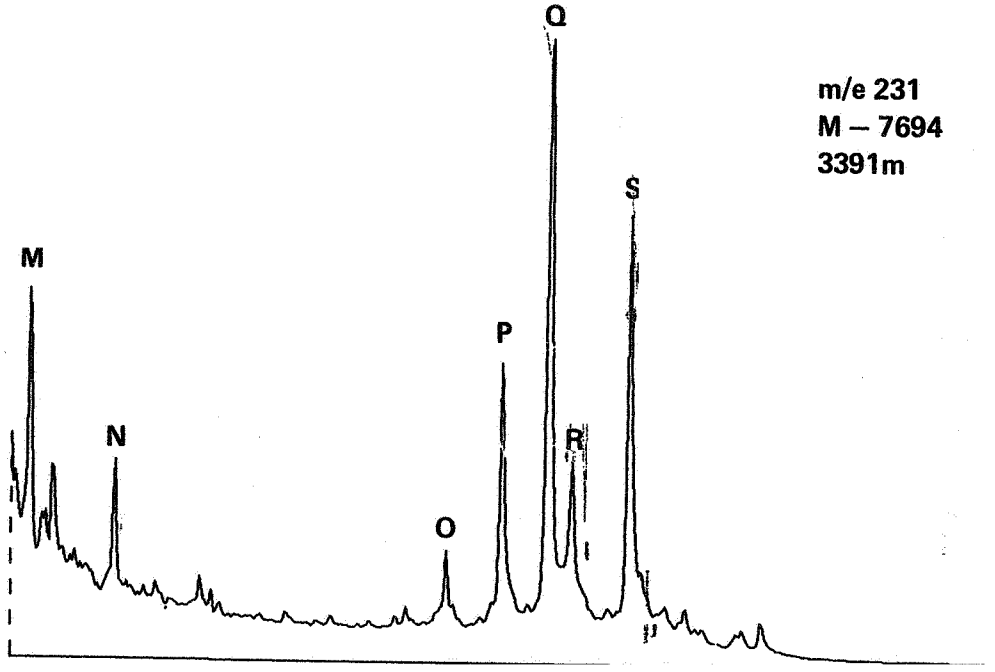
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M – 7694
3391m
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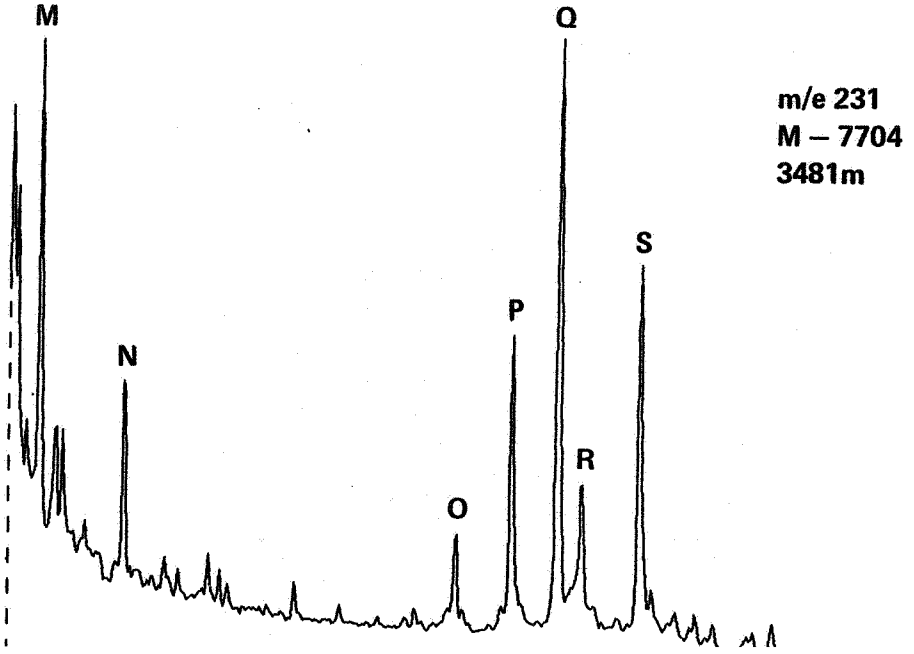
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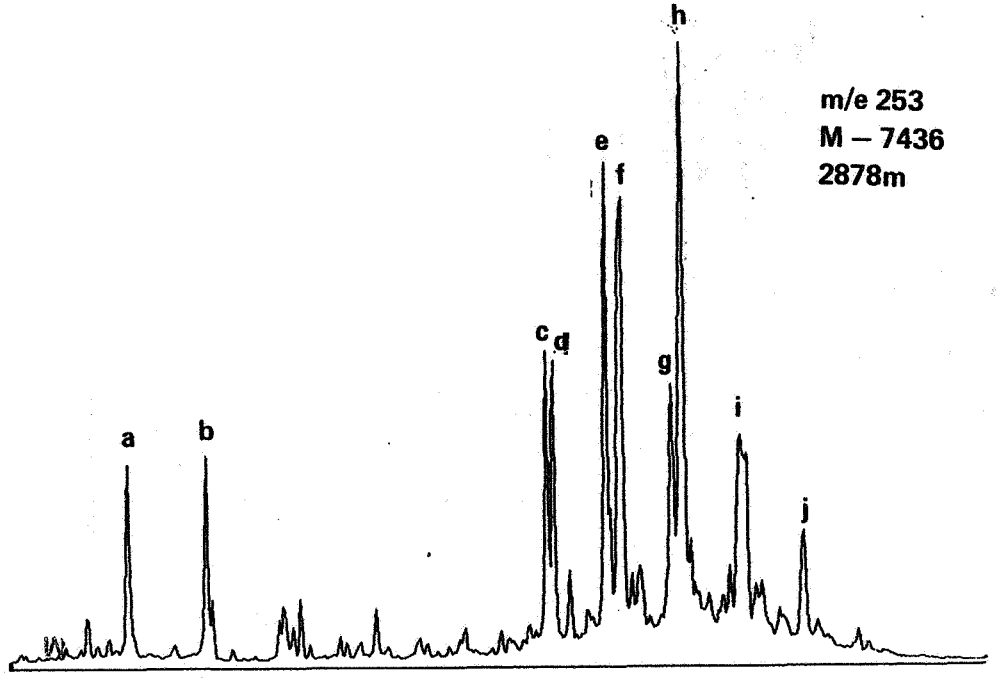
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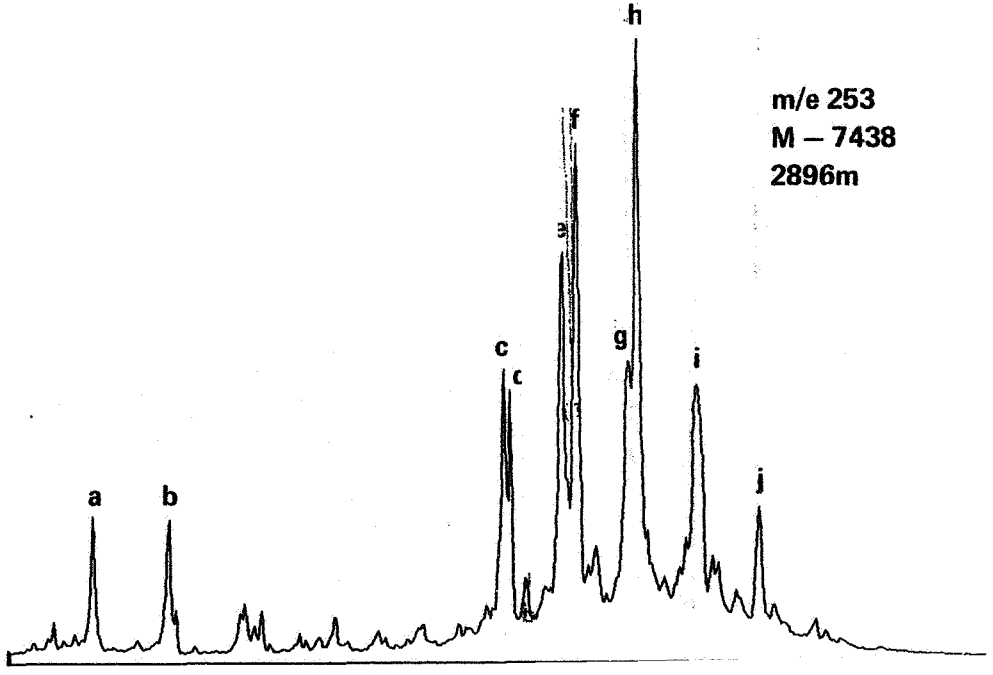
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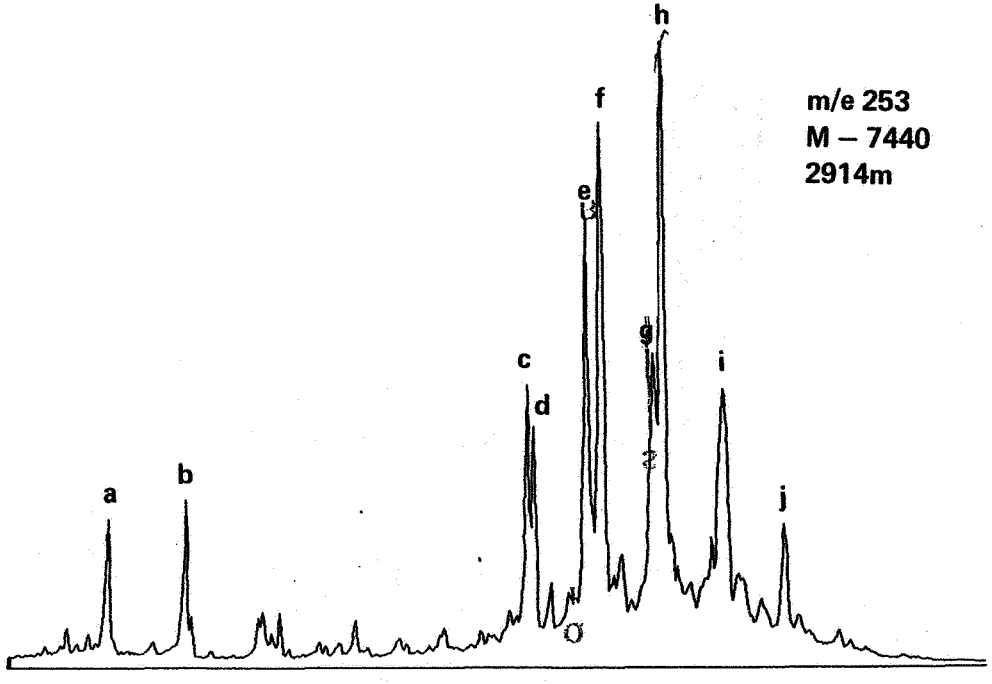
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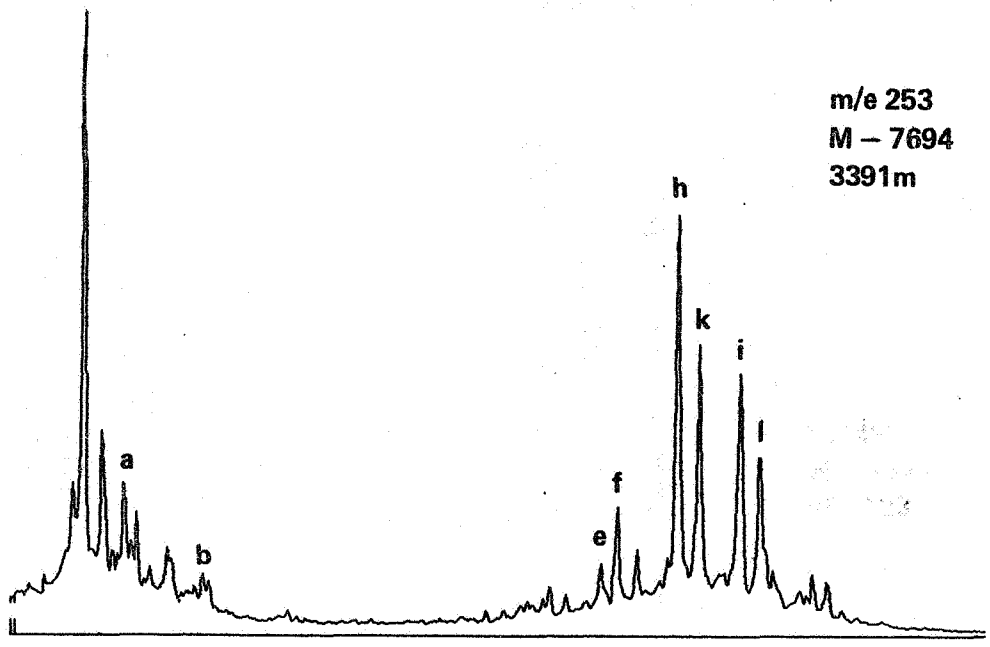
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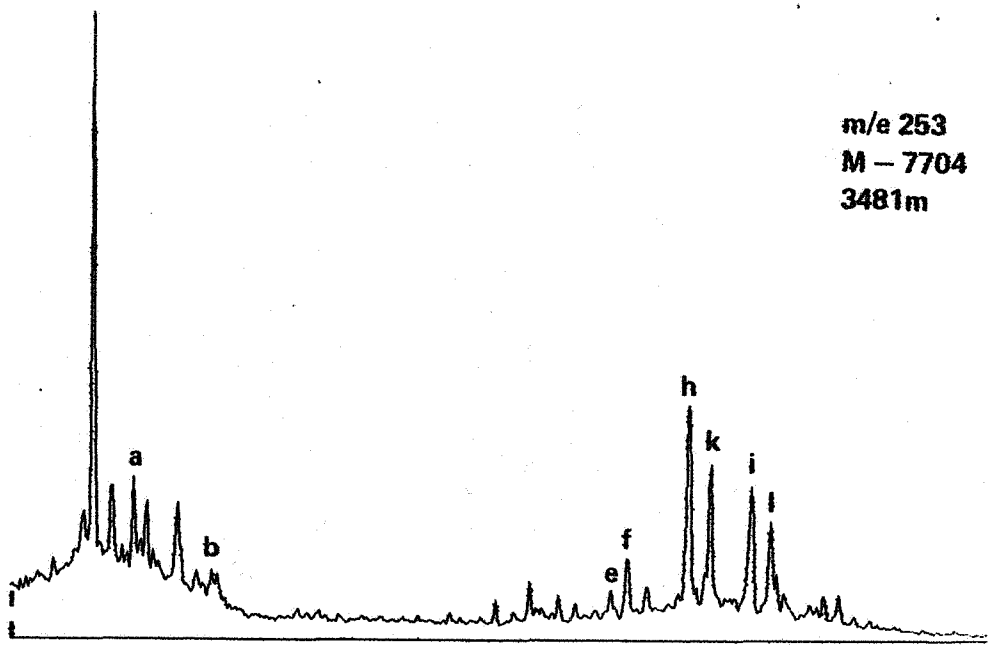
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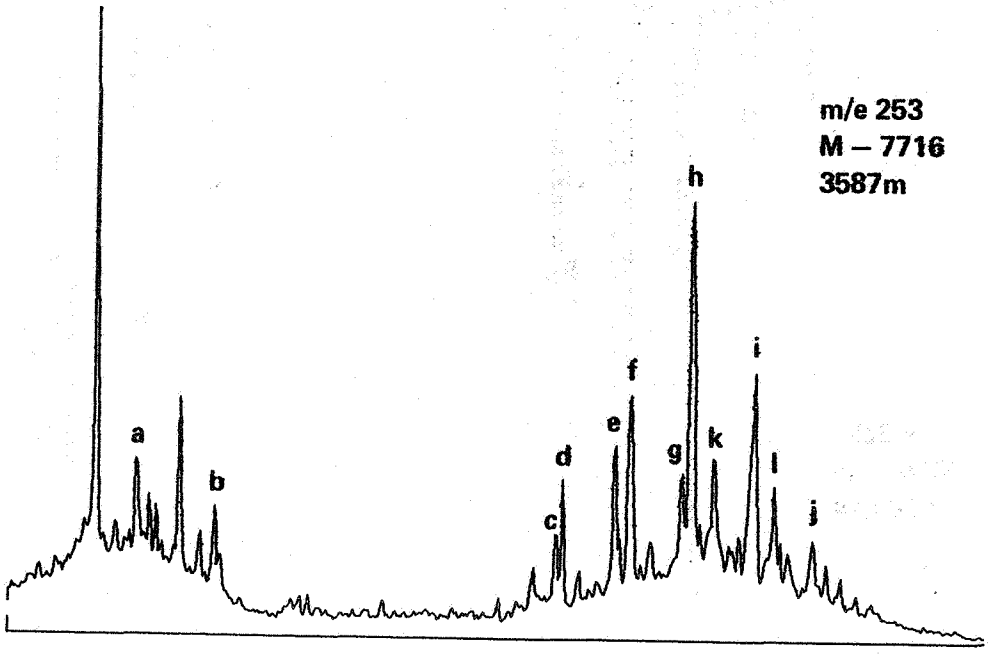
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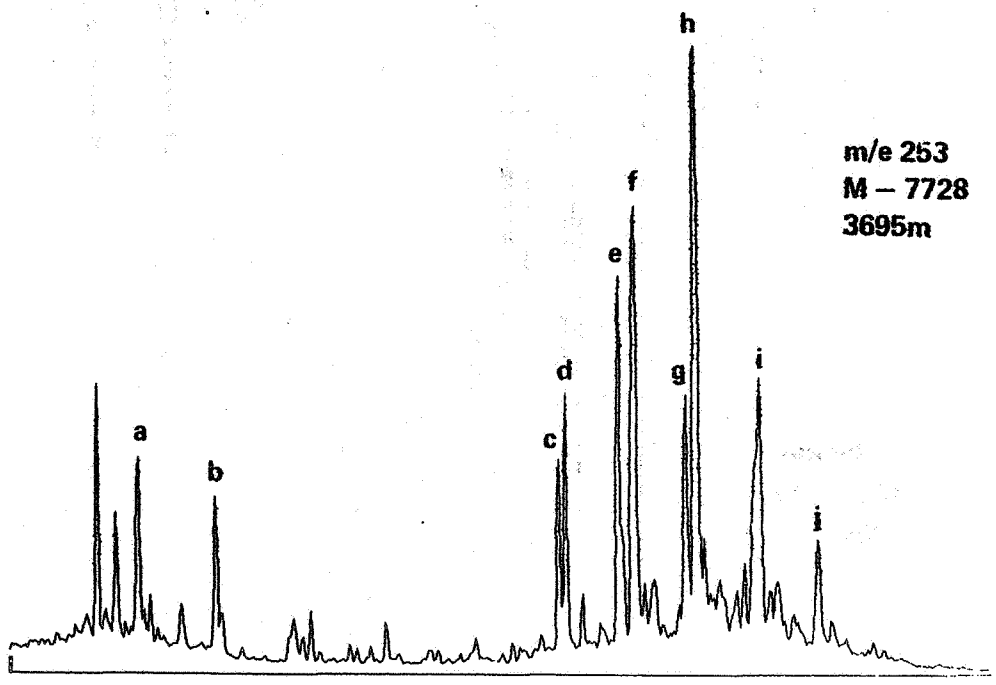
m/e 253
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