

Rega Aphelion

With its third moving-coil model, Rega offers new technical refinements and moves into a new price territory. Is this the cartridge that Rega's top turntables deserve?

Review: **Steve Harris** Lab: **Paul Miller**

It's around 30 years since Rega started building its own moving-magnet cartridges, and ten years since we saw the first Rega moving-coil, the Apheta [HFN Aug '08 and Oct '14]. But although the £2998 Aphelion is derived from the Apheta and Apheta 2, it reflects progress in manufacturing techniques as well as design enhancements. Buyers of the Rega RP10 turntable [HFN Aug '15] can now choose to have the Aphelion factory-fitted at an inclusive price of £5498, thereby saving £498 against the price of the two items bought separately.

RADICAL DESIGN APPROACH

From the start, Rega's approach to moving-coil design has been quite radical. In most MC designs, the back end of the cantilever is mounted in a compliant pivot block and it is held in position by a steel tie-wire that must be tensioned critically. The coils themselves are attached to the cantilever just in front of the pivot. Rega dispenses with the tie-wire by using a long cantilever that passes right through an elastomer pivot block, and carries the moving-coils on its back end. Immediately behind these coils is a small but powerful neodymium-iron magnet. This layout in a way resembles moving-magnet practice, and is very different from any other MC.

For the Apheta 2, launched in 2014, the generator system was redesigned and its moving-mass reduced by halving the size of the cross-shaped iron coil former. It featured a new one-piece chassis/body, with a gracefully curved clear moulded part replacing the Apheta's flat plastic sides, and with a smaller, neater magnet assembly, the whole thing looking much sleeker and more purposeful than before. Behind the scenes,

RIGHT: The Aphelion would be 'naked' save for its lightweight protective plastic enclosure. The rigid 'body' is machined from alloy while the boron rod cantilever is fitted with a Vital-profile diamond

Rega had thoroughly upgraded the way the cartridges were made. Says Roy Gandy, 'A hugely critical area is aligning the cross [coil former] with the cantilever.'

With the original Apheta, the factory specified the precise tracking weight for each individual cartridge, because it was realised that departing from this made the crosstalk worse. But it turned out that what they were noticing was the variation within the normal tolerance of the alignment of the cross.

'Now,' says Gandy, 'we can align the cross within about a tenth of a degree, and it doesn't matter.'

You can alter the playing weight by a gram and still get the same crosstalk and the same channel balance.' [See PM's Lab Report, p51.]

This kind of accuracy is achieved during assembly by viewing the parts at huge magnification on a large monitor. A similar monitor is used when winding the coils. For each cartridge, the operator has to

wind four coils, each consisting of 36 turns of the thin 18µm-thick wire, on to the tiny cross-shaped iron former. For the Apheta 2, Rega reduced the size of the cross, making it 50% smaller than the one in the original Apheta, which was said to be already smaller than those used in other MC designs. This very tiny component is not stamped out but is made by micro wire eroding – spark-erosion on a microscopic scale.

'The Aphelion immediately brought a more spacious sound'

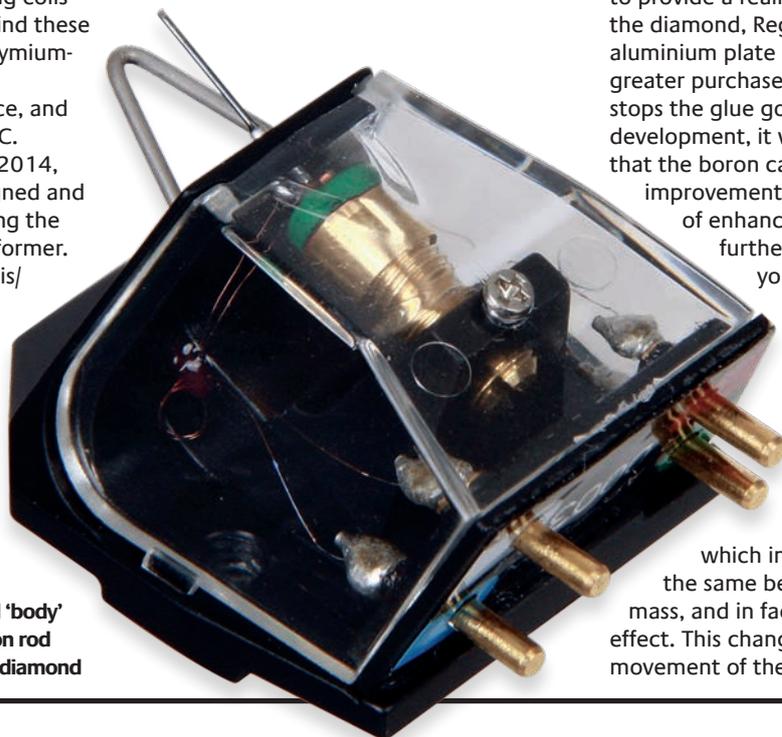
NEW CANTILEVER

Most obviously new in the Aphelion is the substitution of a new boron cantilever for the previous tapered

aluminium tube. It's not possible to make a boron tube, so instead the cantilever is a very thin rod, bonded into an aluminium shank (which can just be seen projecting from the front of the pivot block on our picture, p49).

At the front end, the boron rod is slotted to accept the diamond stylus, and to provide a really strong mounting for the diamond, Rega has added a minute aluminium plate on top, which gives greater purchase for the glue and also stops the glue going through. During development, it was immediately clear that the boron cantilever was a big improvement, but Rega looked at ways of enhancing the performance even further. Says Gandy: 'One thing you can always improve on a moving-coil is the moving mass. That's the limiting factor.'

The cross had already been reduced in size as much as was really practicable, so now, for the Aphelion, it was placed closer to the pivot, which in terms of inertia brought the same benefit as reducing the mass, and in fact had a relatively greater effect. This change in turn meant that the movement of the coils was smaller, and





LEFT: A machined aluminium body and threaded lugs ensure the Aphelion can be securely mounted to any headshell (the third hole is for Rega arms only). Note the fine wires leading from the (moving) coils to the rear cartridge pins

therefore a stronger magnet was needed. But 'It turned out that our supplier had just developed an even more powerful neodymium magnet material which was available in experimental form.'

With this new magnet, and the cross also moved slightly closer to it, the cartridge could be made to give the same output, a claimed nominal 350µV, while the main resonance was, Rega says, pushed up to 20kHz. In other respects, apart from the black body colour, the Aphelion follows on unchanged from the Apheta 2. The stylus itself is once again the Namiki Vital line-contact, a type that has stood the test of time since the 1970s.

While in use, the exposed cantilever gets some protection from the little U-shaped wire frame above it on the nose of the cartridge body. For protection when not playing, a small moulded stylus guard

locates on this frame. It's a better device than most, though still not really foolproof.

In addition to the usual mounting points at ½in centres, there is a third threaded hole at the front. This is for use when mounting in Rega tonearms, and in this case as well as giving a three-point fixing for maximum rigidity, it makes setting-up simpler as you don't have to use an alignment protractor.

GREATER RETRIEVAL

With our Aphelion installed in a Rega RP10/RB2000 combination it was hard not to accept Rega's claim that the design improvements from Apheta to Aphelion helped extract more detail from the sound. Yet this doesn't mean that the cartridge shouts 'detail' at you when you put it on.

It's almost the reverse. You could describe it as sounding more refined and

smoother than the Apheta 2, because the extra detail is not presented as an 'edge' or extra attack. Instead, I think, it is a genuine improvement in the level of information retrieved, which contributes to the integrity of the whole sound rather than making it appear immediately impressive.

As good an example as any was Eric Bibb's 2003 album *Natural Light* [Earthbeat/Pure Pleasure PPAN 018]. With the Apheta 2 I was struck by the great production of the sound, with that tight funky beat, while Bibb's voice had plenty of presence. But with the Aphelion the production became somehow even more immaculate. That guitar solo from the great Hubert Sumlin became even more involving – although it's not over-prominent. On this and other tracks, Bibb's voice became simply more real, especially on 'Champagne Habits', where he's accompanied only by his own clear-as-a-bell acoustic guitar. He was just solidly there, between the speakers.

Out of curiosity, rather than as any sort of test piece, I put on an old Music for Pleasure budget LP, Beethoven's 'Archduke' Piano Trio with David Oistrakh, Lev Oborin and Sviatoslav Knushevitsky, from 1959 [MFP 2117]. And of course, I listened to the end. Here I was struck by the natural wholeness of the sound, especially by the naturalness of the musical dynamics. I found myself awestruck afresh by the mastery of these three wonderful players.

And with many different kinds of music, there seemed to be a few common themes. One of them was the ability to present different instruments in a complex picture with great lucidity and definition. The Apheta 2 does this, but the Aphelion somehow does it more effortlessly.

For example, listening to *The King James Version* with the Harry James Big Band [Sheffield Lab LAB 3], it became particularly easy to enjoy the different timbres of trumpets and trombones in the ensemble passages. Then, with the leader's solo in the opening track 'Corner Pocket', there was a perceptible bit of air specifically around his trumpet. And aside from ↻

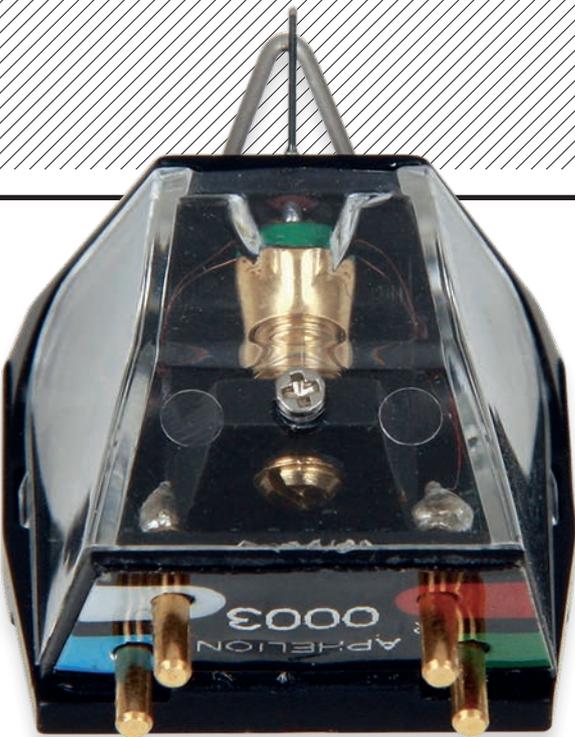
MORE HIGH-END THAN OEM

For many years, part of Rega's strength and a good bit of its reputation rested on a product which it made in huge numbers and 'OEM-ed' out to a host of other turntable makers. In 1983, Rega introduced what in all its guises would become the most successful hi-fi tonearm ever. A manufacturing breakthrough at the time, the RB300's one-piece silicon-aluminium alloy arm tube put it far ahead of the competition. Derivatives of the RB300 also made this design uniquely successful as an OEM product, as Rega supplied arms to many turntable manufacturers. When Goldring briefly marketed Rega-sourced turntables in the mid-2000s, Armour Group's Steve Reichert quipped 'All our turntables are made in the Far East – the Far East of England.' But although that easily-recognised Rega arm tube has appeared under many different brand names, Rega, unlike Austria's Pro-Ject, has never become a big supplier of OEM turntables, and looks less like doing so in the future. Instead, with products like the RP8 and RP10, not to mention the long-promised Naiad turntable, and now with the Aphelion, Rega is clearly beginning to breast the waves of the high-end.

REGA APHELION

While the improved symmetry of Rega's latest, miniaturised MC generator is revealed by the close match in the 'shape' of its lateral and vertical-cut distortion profiles [see Graph 2, below], its tracking performance was somewhat better on the left rather than right channel. Tested at 1.8g through to the maximum 2.0g recommended downforce, the Aphelion cleared the +12dB track (300Hz lateral cut, re. 11.2µm) at <1% THD but only the left surmounted the +15dB track, again within a sensible range of tracking force and bias adjustment. The Apheta 2 [HFN Oct '14] did rather better, tracking like a trooper through the 80µm groove test and offering just 1.2% distortion at +18dB/300Hz. It also offered a 3dB higher output – 405µV versus the 275µV (0.28mV) achieved by the Aphelion, but both with a slightly below-average 0.6-0.7dB channel imbalance.

For low-output MCs, both the Apheta and Aphelion offer a higher 'MM-like' compliance than might be anticipated at ~30cu, suggesting a better match with low-ish effective mass arms. Nevertheless, at resonance, the Aphelion's damped, low-Q behaviour is creditable. But the real difference between the Apheta and Aphelion lies in their frequency response – gone is the former's +4.5dB peak at 9kHz (-8dB cut re. 1kHz/5cm/sec), the perfect frequency to emphasise vinyl surface noise and provide a real 'zing' to treble detail. By contrast the Aphelion has a reduced output through presence and treble (-2dB to -3dB/10kHz), the excellent lateral/vertical symmetry promising a uniform, if warm, soundstage [see Graph 1]. The origin of the slight 'kink' in its vertical (out-of-phase) output at 3-4kHz is unclear, but this did not occur with the Apheta. **PM**



LEFT: Another view of Rega's long boron cantilever and substantial neodymium/iron magnet yoke. The cartridge pins are gold-plated and well spaced to accommodate most tonearm leads/tags

all this, I felt that the piano, bass and drums were all particularly realistic.

It almost goes without saying that when mounted in the RP10/RB2000, the Aphelion maintained Rega's reputation for drive and rhythm. But it somehow did this calmly, just getting out the way of the music. Given a really frenetic recording it seemed to allow the energy of the musicians to come through without the slightest sense of congestion. When I put on Blondie's *Parallel Lines* [Chrysalis CDL 1192], the Aphelion gave me a sound that was bursting with life, but also supremely listenable – a sound that made sense, rather than an assault.

GRACEFULLY SMOOTH

With Eric Clapton's *461 Ocean Boulevard* [RSO 2479 118] it was impossible not to be impressed by the Rega combination's clarity, detail and ability to put over the sheer drive of the music on the fast, rocking opener, 'Motherless Children'. Compared with the same track on the Apheta 2, it seemed that there was a new smoothness to the sound, and yet there was even more going on in the mix.

Refitting the Apheta 2 once more, I listened to Daniel Barenboim and the English Chamber Orchestra in Mozart's Piano Concerto K467 [EMI ASD 2465]. As before, I felt that the sound was fundamentally well-balanced, so that the strings were vivid without being too overbright, while the piano sound was strikingly detailed. Yet to the same record, the Aphelion immediately brought a more spacious sound. I almost

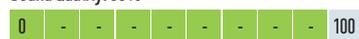
wrote 'more gracious', because this now seemed to be the right word for the expansive opening movement. The piano was presented with all its percussive qualities, and Barenboim's finely-judged dynamics were well conveyed.

But I have to return to *The King James Version*. It may be my imagination, but with the Aphelion in the Rega RP10, I suddenly felt as if I was closer to the emotional atmosphere of that immortal direct-cut session. After 'Corner Pocket', that tightly-arranged and genuinely jazzy opener, the band does 'Lara's Theme' – probably a routine they could safely have followed in their sleep. Then they wake up and let loose spectacularly to roar through 'Cherokee', a great feature for drummer Les DeMerle, until his last triumphant cymbal crash lets us know, especially with the Aphelion, that nothing can go wrong now. ☺

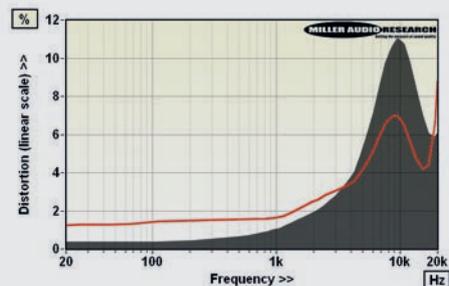
HI-FI NEWS VERDICT

A real step up from the laudable Apheta 2, as it should be at 3x the price, the Aphelion doesn't do anything flashy or characterful. Instead it excels with even greater coherence, 'getting out of the way' and letting musicians put their message over, while accurately revealing recorded ambience and minimising surface noise. Smoother and more neutral than the Apheta 2, the Aphelion is warmly welcomed.

Sound Quality: 85%



ABOVE: Frequency response curves at -8dB re. 5cm/sec, lateral (L+R, black) versus vertical (L-R, red)



ABOVE: Lateral (L+R, black infill) and vertical (L-R, red) tracing and generator distortion (2nd-4th harmonics) vs. frequency from 20Hz-20kHz (-8dB re. 5cm/sec)

HI-FI NEWS SPECIFICATIONS

Generator type/weight	Moving coil / 5.9g
Recommended tracking force	1.75-2.0mN (1.8mN)
Sensitivity/balance (re. 5cm/sec)	275µV / 0.65dB
Compliance (vertical/lateral)	30cu / 28cu
Vertical tracking angle	26 degrees
L/R Tracking ability	80µm / 65µm
L/R Distortion (-8dB, 20Hz-20kHz)	0.70-11.1% / 0.55-11.5%
L/R Frequency resp. (20Hz-20kHz)	+0.5 to -6.1dB / +1.2 to -5.3dB
Stereo separation (1kHz / 20kHz)	34dB / 22dB