

# Dutch Master

## A.J. van den Hul talks with Thomas J. Norton



*E*ducator, physicist, audio enthusiast, audio journalist, and maverick audio designer — Aalt Jouk van den Hul is impossible to categorise. One thing he's always been is a passionately outspoken advocate of looking at audio from new and unusual directions. While active in modifying, reworking, and refurbishing existing phono cartridges, developing cartridges of his own, and producing his own line of audio cables, his public audio career has, to date, been bookended by two innovations: the van den Hul phono stylus, and the use of carbon fibre for the conductors in interconnects. His top-of-the-line

*First interconnect and Revelation loudspeaker cables were favourably reviewed by Martin Colloms in the May 1993 Stereophile (Vol. 16 No. 3, p. 134). The use of the First as a digital link was discussed by Peter van Willenswaard in March 1993 (Vol. 16 No. 3, p. 53).*

*While in high school, A.J. van den Hul operated his own medium-wave transmitter, broadcasting homework solutions and music (played on his own home-built turntable) after school. Handling the amplification system at school sports events taught him a great deal about acoustics, 600 ohm lines, and microphones. He studied electronics and physics at the Technical University of Delft in the Netherlands, specialising in measurement techniques. Subsequently, he taught high school physics and technical high school for 13 years.*

*His intense interests in audio and music eventually drove him into audio journalism in his native Holland. Audio was, for him, an irresistible combination of music — with its strong emotional content and universal appeal — and technology. He found that the better the technician's work, the deeper the listener's emotional involvement. Such involvement remains his touchstone in judging the effectiveness of audio equipment — especially his own designs. I spoke with A.J., as he is generally known, at the 1994 WCES in Las Vegas.*

**A.J. van den Hul:** I got my start in audio in 1948, when my father, who was a valve [tube] collector, died. I was left with a lot of components. I had Lee DeForest valves and all kinds of other items. I broke a lot, but I also learned a lot. It was my father's hobby; it became my hobby, too. It was passed on by way of his components; he couldn't tell me any more because he had died.

**Thomas J. Norton:** *You were a journalist for a few years, though.*

**van den Hul:** I was a journalist for 13 years.

**Norton:** *You've been involved with so many different things in audio, but when and how did you get involved in cables?*

**van den Hul:** It evolved from the crazy business of winding coils in and repairing cartridges. I got the impression that there was something sonically different about the little wires I was using — 20µm copper or silver. Going back to my background in physics, I couldn't really find an explanation of why the wires sounded different. I asked the guys at the university, "Can you tell me why one [wire] sounds different from the other one?" And their answer was, "No, we can't — they should all sound the same, except for what you can measure on your ohmmeter — the DC value." But I thought, "I'm working with AC things. Why are only the DC measurements significant when what you listen to is AC?"

I've done a lot of experiments since then. I have developed very sophisticated metal-wire production processes for making audio cables. But I was always looking for better. I had the feeling three years ago that I couldn't do anything more, creatively, with metal. The reason carbon came up is because carbon is, under normal temperatures, a very inactive material chemically. I have found that there are a lot of changes in audio cables — and other audio equipment — due to chemical deterioration. And to prevent chemical deterioration, you have to use less chemically active, or chemically inactive, materials.

There are also a lot of mechanical reasons why products change — the bending of metals, for example. Producing wires for conductors is a very deteriorating process, particularly when you chemically coat copper with silver. In the process, you bend the cable, stretch it, bend it, stretch it again — 30 or 40 times — so the wire is worn out even before it's silver-coated. That's one of the reasons why silver-coated copper sounds harsh. There's also the chemical deterioration under the silver which starts to break down the structure of the copper before even the slightest coating of silver is done. The finished wire has already deteriorated. It looks very nice and shiny on the outside, but the enemy is inside. You have fundamentally killed the product. So silver coating, chemically, is the wrong way; silver coating *mechanically* is a better way. That's what we do with the better type of cables: we have a mechanical instead of a chemical coating.

So, to answer your question: I was unhappy [with these problems in metals]. Perhaps, I thought, there was a different way. I was always telling my students, "Never do it the traditional way. Always do things differently." When everyone else walks from A to B, you walk from B to A. If you look at the same things from a different direction, you come up with

different ideas which help you to better solve problems. Never copy solutions from someone else — always come up with better ones. That is my main point.

Change everything. Change the conductor, the insulator, the layout — whatever you can think of. At worst, it will be the same. If your ideas improve the situation, you will have found a better way.

**Norton:** *Did you try any other materials?*

**van den Hul:** I'm always doing experiments in my mind. It saves me time and money, and I can do the experiment in an aeroplane, when I can't sleep at night, or whenever. It's a very fast way of coming to solutions, just mentally working the problem. That's how I came up with this material. I'd been working with other materials, too, but this is — so far, I think — a very good solution. I know of better solutions than carbon, but they are very hard to do at the moment. There's a technical threshold, therefore I'll do carbon now.

**Norton:** *You use carbon for your interconnects, but on your Revelation loudspeaker cable, you had to go another route — because of the resistance problem?*

**van den Hul:** My target is to produce a speaker cable — the Third — with an impedance of about 0.05 ohms/meter. At the moment we have reduced, by technical improvements, the impedance of the fibres by a factor of six. We want to go down to a factor of ten, then by another factor of ten. So, fundamentally, I'm working on a program to work down the impedance of the fibre by a factor of 100. Then we can produce the Third. It would otherwise be too bulky.

**Norton:** *Do you reduce the resistance by increasing the size of the conductor?*

**van den Hul:** No. That's the technical way. The "physics" way is to line up the carbon in a more correct way, with better conductivity as a result. Carbon is, normally, randomly ordered. Our method is to apply extra energy sources to line up the carbon in a better way. On the carbon itself, and the application of carbon to audio, I have obtained a 1990 US patent.

My aim is ultimately to make a metal-free speaker cable. All metals have chemical *and* mechanical activity. It's the same as with your first bicycle. It became worn out — parts rusted or broke off from metal fatigue. The same with your first car. That's the natural way of metals. Metals always run down in a most disordered fashion. Man is there to organise, purify, and bring metal up to the highest possible level of purity; and as soon as it's there, it will collapse again. So it's the eternal movement, up and down, fighting the natural tendency of metals. You have to find a different material so that you don't need to fight it anymore.

The second — and most important — goal was to come up with a material that was environmentally friendly. By using so much copper in conductors, we spend the capital of this earth instead of the interest. The capital is the original resource. There's much more carbon on this earth than [there is] any metal. The good thing about carbon is that it can be recycled. The First is a completely recyclable product — we chop it, melt it again, and use it as an extrusion layer over our speaker cable. There's no other cable manufacturer able to recycle his product with his own processing. They only burn it and create a lot of waste — the impurity of the copper which is left is so great you can't use it any more. I also wanted to use, as far as I could, natural materials to be sure that I was attacking our environment no more than was strictly necessary.

**Norton:** *There are, of course, two conducting elements in a cable: the conductor itself, and the connectors. Are there any particular problems you've run into with the connectors using this particular material?*

**van den Hul:** Yes. So far the product can't be soldered. At the moment, we clamp it.

**Norton:** *So there's no solder to make an airtight join. While that wouldn't be a problem with the carbon, which doesn't deteriorate, there would be a problem with the connector itself.*

**van den Hul:** Currently. There's always a metal part involved. The best idea I could come up with was to let the group of fibres continue and use that as the centre pin of the connector. That's another thing I've been working on — to make the whole of pure carbon. But that's a technology you might expect from NASA. It's a little tough for a small company to realise all those things. But the ideas are there.

The difference between a metal conductor and this carbon conductor is that low-level information passes extremely easily through the carbon, where it would be blocked in a metal conductor. Because of boundaries built up in the metal, the centre part of the sinewave, near the zero-crossing point, cannot pass. The result is a kind of crossover distortion, where the low-level signal disappears completely. With the carbon cables, even though it has a higher DC resistance than copper, there is less of a blocking effect. So the sound is much more detailed, without the unnatural aggressiveness caused by the sharp edges of this "crossover distortion" produced in a copper wire. That means that the sound is much smoother and has higher resolution at low levels than in any metal product.

**Norton:** *When you use the carbon interconnect between, say, a CD player and a preamplifier, its relatively high impedance has little consequence; but if you use it for a phono interconnect, wouldn't it add significantly to the source impedance of the cartridge?*

**van den Hul:** It does add to the source impedance of cartridges, but a lot of cartridges play better when they are loaded with high impedance than with a lower impedance. It doesn't have that much effect.

The current is practically zero, so the voltage drop by itself is also very limited. The First gives superb results with phono cartridges (\*) because all you're dealing with is low-level information, where the performance of conventional cables is worst.

(\*): Currently The FIRST<sup>®</sup> Metal Screen (a metal-carbon shielded version of The FIRST<sup>®</sup>) and The SECOND<sup>®</sup> (a metal-carbon shielded balanced version of The FIRST<sup>®</sup>) are available. When intending to use our Linear Structured Carbon<sup>®</sup> cables' superior qualities for the transport of low level signals (like those from phono cartridges, microphones, etc) we advise to use The FIRST<sup>®</sup> Metal Screen or its balanced version The SECOND<sup>®</sup> instead of The FIRST<sup>®</sup>. —**A.J. van den Hul B.V.**

**Norton:** *I've always wondered whether you're better off with long interconnects and short speaker cables — which is the most popular option today — or the reverse. With the fact that your cable is of fairly high resistance, is there any situation where there would be a problem using unusually long interconnects between the pre and power amps?*

**van den Hul:** There are two questions here. First, in what situation do you use a long interconnect and a short speaker cable, and in what situation do you use the opposite? In my experience, and based on what I have just told you about low-level information, the shorter the cable, the better. With a poor-quality interconnect, keep it as short as possible, and make the speaker cable a little longer. But with high-quality cables, do the opposite.



That is, the power amplifier controls the speakers better through a very short speaker cable. The longer interconnects don't create much of a loss, because a power amplifier has an input impedance of around 50k ohms. This cable is about 50 ohms a meter, so 10 meters is 500 ohms; 500 ohms is 1% of 50k ohms; 1% calculated in dB is 0.1dB, or whatever it is (\*), so you don't create any losses.

(\*): More accurately; In the above situation 10 meters of The FIRST<sup>®</sup> cause the signal to be attenuated a mere 0.086dB — 0.0086dB each meter. —**A.J. van den Hul B.V.**

**Norton:** *Is there the same type of scepticism about cable sound in the mainstream European audio press as there is in this country?*

**van den Hul:** My experience with the European press has been that there was a certain scepticism about the carbon fibre cables because it's a new material. After reviewers listened to the product, however, they were extremely happy with the quality. There is more openness there toward products using a different approach, a different idea.

You will find very few journalists declaring that there is no difference. We're all human beings — we all have two ears, two eyes, one nose, one mouth, and two arms. But are we all the same? No. We are all blessed with creativity, but everyone uses his creativity in a different way. Why cannot a creative designer create equipment that is different from another piece of equipment that has been created by another creative designer with a different style, feeling, mood, taste, education, family tradition? Or in amplifiers, for instance: different components, different printed circuit board layouts, circuitry, ground system design, wiring, looping, a feedback system, a feedforward system? As long as different people work on different things, the results will be different. How can it be that the results will be the same?

The Second balanced carbon cable has been used by several recording companies. They are strongly committed to the sound-quality improvement this cable makes over metal cables. If all cables are the same, why do they hear a significant difference? Why are microphones all different, technicians using specific microphones for specific purposes? If all microphones are the same, all recordings should be the same. (1)

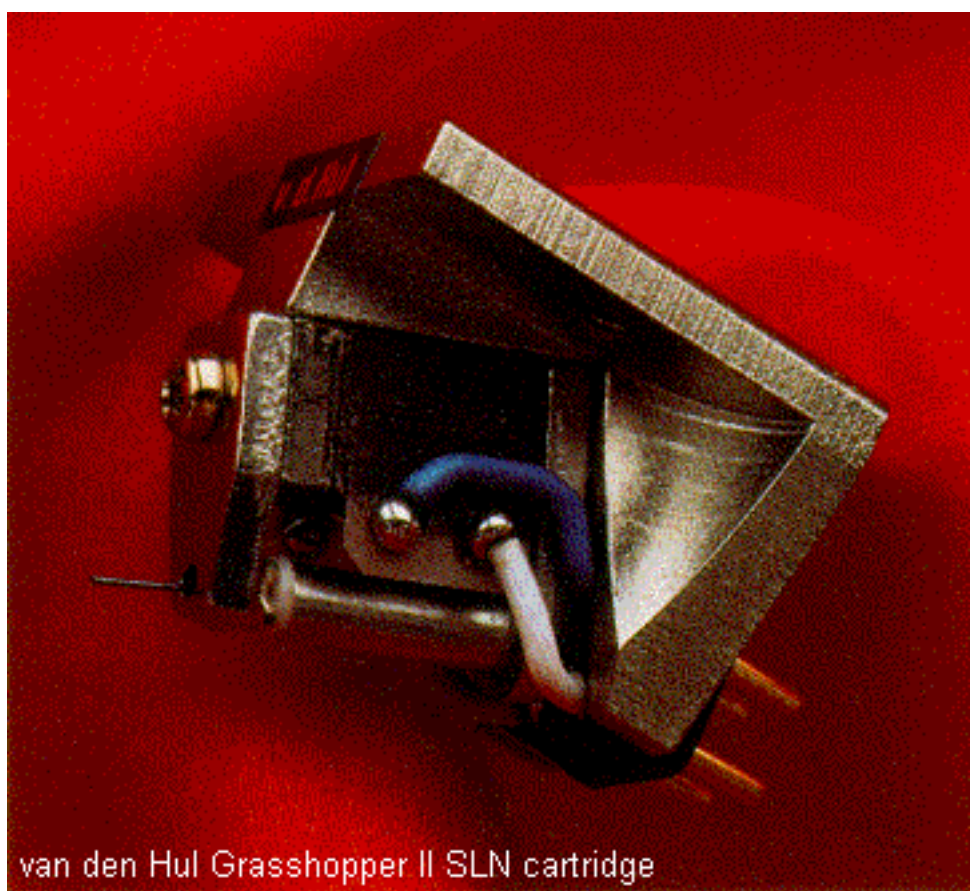
(1): AJ's remarks here were a bit unclear, and in adjusting the wording to read smoothly — his English is excellent, but his syntax somewhat unidiomatic — the final version here may overstate his intent. With his expertise in transducers — primarily phono cartridges — I'm certain that he's aware that experts will not dispute the fact that important differences still exist in cartridges, loudspeakers, and microphones. And for clearly measurable reasons. —**TJN**

**Norton:** *Is your preference for balanced operation?*

**van den Hul:** Yes. With the carbon interconnects, there is the possibility of hum loops in the unbalanced mode; but in the balanced mode, there isn't.

**Norton:** *Building cartridges seems to be your favourite audio occupation. How did you get into the arcane business of retipping, modifying, and building phono cartridges?*

**van den Hul:** It was a challenge. Being a journalist, I once visited a tip manufacturer who was supposedly producing round tips [spherical styli]. But he got elliptical tips from his machine, and didn't understand why. At that time, I was not



particularly interested in tips, but more in cartridges in general, so I tried to explain to him how a tip worked in a groove. By explaining it to him, I simply got the idea that what we were all doing was wrong. We had a round tip tracing a groove.

By reducing the radius [of the tip front to back] and enlarging the vertical dimension, I made, at that time, the sharpest edge available. It would track all the minor movements cut in the groove by the cutter. Reverberation in the recording, especially, is smeared out by the round tip — all kinds of minor movements are not traced by it. So you have to reduce the [front-to-back radius] and enlarge the vertical dimension of the tip to maintain groove contact and improve resolution. That was the main idea.

The biggest problem was to find a manufacturer who could do that. My first manufacturer couldn't. The second did it after two years of research in grinding, polishing, and so on. That was in 1976. To the present, 1.3 million tips world-wide have been sold and used. So it has been a success. Not too many nice ideas in audio have ever reached

that number.

**Norton:** *Do you also get involved with cantilevers?*

**van den Hul:** Yes. We start with the tip, the next step is the cantilever, the next step is the coil and the armature, and the next step is the magnet system.

**Norton:** *And you have a whole new cartridge.*

**van den Hul:** You have a whole new cartridge. So it worked out. At the moment, I have a very nice cartridge called the Grasshopper. It's the result of the many years' experience I've had in collecting, building, testing, and repairing cartridges.

**Norton:** *The Grasshopper is built from the ground up by you?*

**van den Hul:** Yes. No other manufacturer produces any specific part. It's all built up from the basic parts.

**Norton:** *Do you still find that you have a significant business in retipping other cartridges?*

**van den Hul:** Yes. In a year I retip about 1000 to 1200 cartridges, world-wide. And I work on about 400 to 500 new units a year. So it's not that big. That's all lines together — the cheapest and the most expensive. And the Grasshopper is, I think, up to about 400 units a year total, world-wide.

**Norton:** *I would think that, as the new-cartridge market gets smaller, with fewer new cartridges available, more and more collectors will ask you to retip and refurbish their older cartridges. Are the retippings you do today just that, or do you also replace the cantilevers?*

**van den Hul:** Oh, many, many more things. Cartridges are getting older and older — with no replacements available from the manufacturers. This means that, every time a cartridge comes to me, a little bit more rework, replacement, adjustment, refining, cleaning, and tuning are needed before the cartridge is again in proper working condition. So it takes more time and effort now to do a specific cartridge than it did, say, five, six, seven years ago, because the cartridge has aged another five, six, or seven years.

It's a pity the Garrott brothers passed away, because they did a lot of work. (2) I received more business because of their passing than I expected. We've refurbished cartridges done by them before.

(2): The Garrott brothers of Australia, who passed away in 1991, performed similar retipping and modification work on phono cartridges. Their work was better known in Europe — particularly the UK — than in the US. —TJN

**Norton:** *There are many people who feel that the first thing to actually go in a cartridge is not the stylus, but the damping materials.*

**van den Hul:** Damping materials do age faster than tips, but not when the latter is an artificial diamond. Artificial diamonds, with a lot of impurities, have a very short lifetime of about 400 to 500 hours. A very good, natural, crystal-oriented diamond — the type I use — has a life of around 2500 to 3000 hours. So it's worthwhile to replace a cheap tip with a better one, because your cartridge will last longer. If the damping material is an artificial rubber, or a good blend of artificial rubbers, yes, it will also last 2500 to 3000 hours.

But there's one thing I would like to bring up here, and stress with all the power and force I can. *Never* use a cable enhancer on a cartridge, because you will really burn the cartridge's coils. I've had in many cartridges in which people had used a cable enhancer to break-in the tonearm wires — forgetting that the cartridge was still attached at the other end of

the arm. The coils were completely burned out — the enhancer even heated them up so much that the rubber and everything was melted together into a sticky paste.

I'm not referring to cartridge demagnetisers — I'm referring just to the regular cable burners, to warn everyone. . .

**Norton:** *The ones people use to break-in their cables.*

**van den Hul:** Yes. The current is too high. The 20µm wire used for cartridge coil winding is more or less a fuse. It gets really hot, you come close to the melting point of the copper or silver wire, you really stick and burn everything together. Please, don't do it.

**Norton:** *So if someone were inclined to use one of these devices to break-in their tonearm cable, they should short the cable out.*

**van den Hul:** Yes. Take out the cartridge [from the loop], leaving only the tonearm wires. (3)

(3): Disconnect the pins from the cartridge, short them out (left ground tied to left hot, right ground to right hot, but left and right still isolated) so that the cartridge is completely out of the circuit; do your break-in, then reconnect the cartridge. Be sure you know the colour coding of the leads on your tonearm (check your manual) before you start. If you need more of an explanation than this to perform the operation, you shouldn't attempt it at all. —TJN

**Norton:** *And breaking-in the tonearm wires themselves is a good idea?*

**van den Hul:** The normal soft-pulse demagnetising units are good things, but I've found that it's a kind of drug — once you do it, you have to do it often. You can never stop.

Cable burn-in is very positive, because you fundamentally weld parts together with "microbridges" not present before the burn-in. But as soon as you bend the cable by lifting it, you break them open again. So once you've burned-in the cable, don't touch it — leave it as it is, because as soon as you move it, you break it open and must start again.

**Norton:** *That makes it a rather impossible situation for reviewers, who can't leave things alone. We have to constantly move things around.*

**van den Hul:** You don't need to burn it in again for long. A lot of people do it for 24 hours — they don't need to. Once it's "microbridged," it's not necessary. But temperature variations make cables move. Sound on a wooden floor makes the floor move, so you break it again. (4)

(4): It later occurred to me that if these easily broken "microbridges" are, as van den Hul suggests, the operative mechanism, then you can never effectively break-in your tonearm wires, subject as they are to both vibration from inevitable tonearm resonances, and flexing at the arm pivot. —TJN

**Norton:** *In your work on designing and modifying, and on retipping and building cartridges, have you developed feelings on how much of it is art or craft and how much is science?*

**van den Hul:** It is not a wet-finger process. It's really science how a magnetic modulator works, it's really science how a wire works, it's really science how a damper works, and it's really science how long a suspension wire should be. It can all be calculated and optimised. You can learn things by a lot of trial and error, by practice. But the best way is to calculate things — you have to do it that way. A cartridge is not a happy [accident]. It's really physics.

**Norton:** *What do you see as the future of analog, since that has been a subject of keen interest to you over the years?*

**van den Hul:** At the moment I do not see a further drop-off in interest in analog. I even sense a growing interest. Of the most recent shows I've seen, the one that astonished me most was the high-end show in Frankfurt, where there was a huge interest in analog. So I think analog will be revitalised. People will further improve analog reproduction systems to maintain, specifically, the musical value of recordings not available on CD. [Digital] has been pushed strongly in the market. It was [promoted as] *the* solution. And I'm sure a lot of things will be digitised in the future. But I also respect people who think that analog is the better solution. You shouldn't have to eat white bread when you think brown bread is better. Give everyone the freedom to buy brown bread, whether you like brown bread or white bread.

I'm not a hard nut when someone likes digital. Let him think digital. When he likes analog, I think he should have the right to choose analog. My personal love is more analog than digital.

A lot of money has been invested to upgrade the image of digital. It was a very bad system when it was introduced — the technology was very limited. So it was just marketing. Analog was pushed into the corner. It took several years before analog people realised we had a good thing — why should we stop? So analog came back, and now there's a healthy battle between digital and analog.

I completely agree with digital people that analog has a lot of defects. But from the same point of view, analog people can also argue with digital people that there are defects in digital. So rather than point out the defects, why not share our love of good sound reproduction, using both technologies to help everyone who really loves music?

**Norton:** *Do you have any advice to give our readers in choosing the right hi-fi system?*

**van den Hul:** The most important thing is to first choose the right hi-fi dealer. The right system comes later, automatically. A good dealer demonstrates in a normal living situation; he is a regular concert-goer; he uses both CD and vinyl; his loudspeakers are not set up in a massive soundwall, but in individual pairs, on good stands, at a client's request. Don't go in on a Saturday. Make an appointment and arrange for what you want to hear in advance. Once you have found a good dealer, listen to his advice. He is the expert, and you learn from him.

**Norton:** *Have you dabbled in other areas of audio — amplifiers, loudspeakers?*

**van den Hul:** Yes. We have produced a 1250W, 8 ohm power amplifier for a big recording studio in South Africa. It has opened the door for electronics to us. I'm also working on a very good D/A converter.

So, as long as audio is a way in which people can communicate, I think that anything you can do to improve the quality, the better. What you see here in Las Vegas is lack of communication. You see all the slot machines, people sitting there putting in coins, spending what I've calculated on some machines to be \$100 a minute. They just feed in \$100, only communicating with machines. There are better things in life than to communicate with machines.

We have created a lot of machines around us — the telephone, television, radio — all artificial things. So we lose the ability to communicate with each other, or we communicate with other people through machines. I think that takes away a lot of the value of communication. In the past, people could communicate together without all those things. The sooner we learn to communicate again, the better.

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