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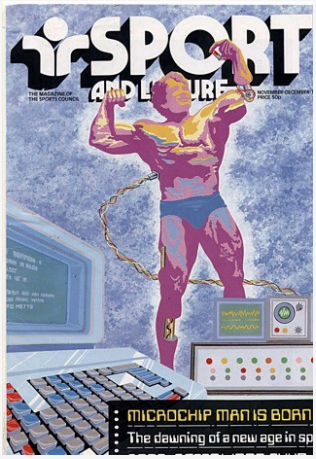
Computer-Built Champions

The extraordinary story of the American women's volleyball team



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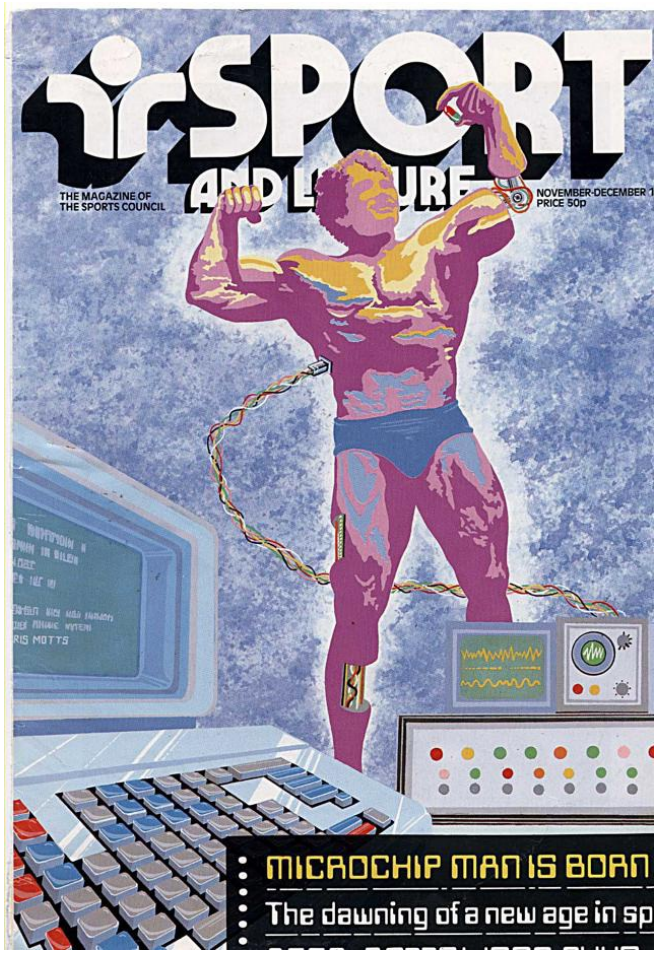
The article discusses the use of technology in sports coaching, focusing on the transformation of the USA women's volleyball team from being ranked 50th in the world to becoming Olympic champions. The team's success is attributed to Dr. Gideon Ariel, a former director of the US Olympic Training Centre, who used computer technology and scientific methods to determine the ideal physical and mental characteristics of a volleyball player. The team was then assembled based on these characteristics. The team also used computer simulations to analyze and improve their tactics and techniques. Despite their success, the team was defeated by the Chinese team in the Olympics. Dr. Ariel predicts that in the future, holographic figures will be used in training. The article also mentions the Sports Science Advisory Service at Alsager College, which offers a comprehensive assessment of an athlete's capacities using film and computer technology.

Below find a reprint of the 4 relevant pages of the article "Computer-Built Champions" in "iSport":



MICROCHIP MAN IS BORN

Computer-Built Champions

The extraordinary story of the American women's volleyball team

THE proposition: to turn the USA women's volleyball team from being a no-hope prospect, rated 50th in the world, into Olympic champions.

Not possible for mortal man, you might think. And you'd be right — except that for mortal man *plus* a computer, *plus* the dedication, staff, time and money — it turned out to be very possible indeed.

The man was Dr Gideon Ariel, Israeli-born former director of the US Olympic Training Centre, and a fierce champion of high-technology sports coaching. He took the proposition as a straight scientific experiment, and went about finding a solution — as he explained in a recent radio programme.

Formula for Success

The first step was to determine what physical and mental characteristics made up the perfect volleyball player. It was eventually agreed after studying miles of footage, that the ideal player would have the speed of the Japanese and the height and flexibility of the Russians. Plus a vital factor — the capacity to adapt one's game to play on the weak points of one's opponents.

That having been decided, Dr Ariel's men set out to find the real live girls to fit the brief.

'First off, we find a girl we like called Flo Hyman, six foot six. And we go to Flo Hyman and we say we'd like you to play volleyball, and she says you must be nuts. I mean I am playing basket ball once in a while, I have never played volleyball. And we say well you are going to be a volleyball player because you have the characteristics we need. Then you go to another girl, she is six-four, then a six-three, and then we had to bring them all to a certain point where they are going to live together and go to parties together, and now we really start from scratch — half the team never played volleyball before. It took about two years really to create all kinds of conditions where finally we had twelve to fourteen girls that had the potential.'

Then, of course, they had to learn tactics and techniques, helped of course by Dr Ariel's film-assisted observation of the sport. He and his team discovered, for example, that there was more chance of a 'spike' (volleyball's equivalent of the overhead smash) working if the spiker did not bring her arm all the way back before making it. The discovery had instant results: but soon the Japanese had twigged it.

'We found,' said Dr Ariel, 'that when we go in to spike with the Japanese, they are looking at our arm and they already know what to do on the court. So we start running probability studies, and we find our girls are 75 per cent of the time spiking to the right, and the Japanese have figured this out.

'So we say we are going to have a strategy, and we carried out the same kind of analysis they use in the Israeli military. When they are going to attack something they want to know what to do if there is an aeroplane or missiles or soldiers there, and the computer will actually give them the information for the least resistant path, for when you are going to invade something you don't want to take the wrong route, and with a computer you can simulate the whole thing.

'Well it is no different here, you use the same technology. Here is a girl that can spike, here is a girl that can defend, here is a girl that can do certain things at certain speed. We want to find it and quantify it so we divide the court into 360 squares, and it is like playing poker with somebody and having all the cards numbered. And then we start winning, we start beating teams that are stronger than us, but we have the better probability. I mean, the Chinese are a better team than us, but we have a better probability, we know where they are not very capable. We have a better computer.'

Not, it should be mentioned, such a better computer that it could plot an American gold medal at the Olympics. In the event, it was in fact the Chinese, computer-less and bare-handed, who defeated the hardware-toting Americans and took the gold. Nevertheless, Dr Ariel's science-sponsored achievements speak for themselves. In just seven years he has created, Frankenstein-like, a 'world-beating' volleyball team out of a bunch of girls who'd never even played the game before.

> "Before the next Olympics we will be able to create holographic figures on the other side of the court, so our girls will play against the laser light which will represent the real thing"
>
> Dr Gideon Ariel, Director
> US Olympic Training Centre

Now he talks about playing the entire game on holographs, plotting the probably moves of opponents is in any given situation, and playing out the entire Olympics before they even take place.

'With the computer-laser technology today, a coach in the future will be able to create the real players from the other side and start moving them around the court, just like we use a simulator in the computer games today, and our girls will be able to react-actually spiking and defending against a machine.

At present, the only thing we are missing is that we cannot create the figures from the other side of the court; we cannot tell China to come here to play against us every day. But in the future — and I feel before the next Olympics — we will be able to create holographic figures on the other side of the court so our girls will play against the laser light which represent the real thing'.

Dr Ariel was appearing on BBC Radio 4's 'The Chip Shop' presented by Barry Norman.

Right: The USA women (dark shirts) during their LA Olympic final against China. They won the game on computer — but not in the flesh!

Photo: Associated Pr

MICROCHIP MAN IS BORN

The Secrets of Success

Chris Middleton meets a team of sports scientists who have the knowledge to turn the mediocre into medal-winners

TALENT is a very indefinable thing, and most people like it kept that way. 'You've either got it or you haven't' is the standard explanation of success — and that's as far as it goes.

Somehow it isn't considered quite respectful to try and dissect a God-given gift like natural ability. And on that basis, the utilisation of man-made machines in order to discover the secrets of that ability is not far removed from the sacrilegious.

That being the case, the team of sports scientists at Alsager College would not have lasted long during the Reformation. For not only do these heretics capture the secrets of sporting success on computer, they actually run a service that passes them on to others.

In fact, it costs just £100 for the full Alsager 'servicing' of a sportsperson. For that sum, you get a complete assessment of your sporting capacities — both present and future. And that takes in literally **everything** — from your fat levels to your fitness, from your posture to your personality.

It's called the Sports Science Advisory Service, and it offers a three-part analysis across your entire sporting spectrum. The first part is the biomechanical assessment, which is in the hands of Roger Bartlett, a trained mechanical engineer, latterly diverted down the paths of sports science.

Roger and his team aim to analyse, with the help of film and computer technology, exactly what — in terms of speed, power and every conceivable angle of knee thrust and arm movement — an athlete is doing. They stick adhesive markers on the 18 prime points of their subject (eg elbows, knees etc), and then, using a camera that records 200 frames per second, film him performing the same action again and again.

'We generally narrow it down to 80 frames before starting our analysis,' says Roger. 'Then we plot the exact position of each of those 18 points at each frame.'

The result is a computer print-out of just what's gone on during, say, the crucial moments of the long jump — ie the angle of take-off, the force of landing on the take-off board, the speed of the run-up: in other words, vital knowledge, some of which the eye of a human coach might spot, but most of which will be missed.

Information so comprehensive, in fact, that it makes one wonder whether it might be a better idea to drop the flesh-and-blood coach and take up with a computer. But that is not the aim of the Service.

'We are not here to supplant the coach, we're here to **supplement** him,' is Roger's emphatic reply. 'All we do is supply the coach with the information, and from then on it's up to him what he does with it.

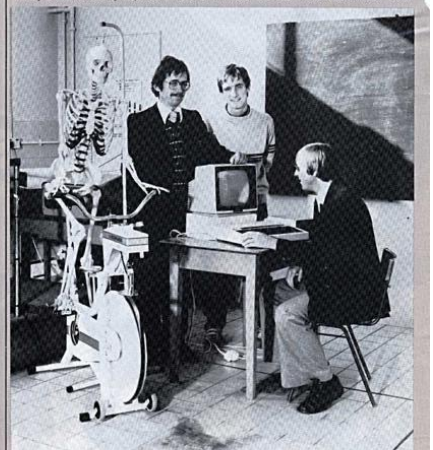
'There's no way a machine can perform all the jobs a coach does, but by the same count, there are some things a machine can see that a coach can't. Probably coaches in this country try to do too much — they're biomechanics, psychologists, physiologists and coaches all wrapped up into one. We can help them out with some of those jobs.'

Not, however, that the sporting world is convinced of this. For, despite having helped athletes and coaches to achieve significant improvements in performance, the Service is hardly overwhelmed by inquiries. In fact, a mere nine athletes in a year have been brought in for an Alsager 'service.'

This low rate of interest does depress the Alsager team. Nevertheless, this depression is somewhat tempered by the knowledge that a full analysis takes approximately 100 hours of their free time, on top of their day-to-day teaching commitments at the college.

The bulk of those 100 hours is taken up by the analysis of the biomechanical statistics, and also by the extensive physiological tests in Phil Jakeman's laboratories.

Here, in the converted college kitchens, where the old meat stores have been



The Alsager team (l to r) of Roger Bartlett, Phil Jakeman and Les Burwitz carry out some tests on a subject distinctly short of body fat, in the College physiology labs.