

GENEVIEVE'S WAY

HERMENEUTICS OF JET NOISE

When asked some time ago whether I'd be willing to deliver an address on this particular occasion, Geneviève, I went supersonic ! I spouted « Yes, I can » well before my colleagues had even uttered a word – just too bad the mysteries of turbulence-generated sound had always lain trembling beyond the threshold of my understanding !

I had spontaneously felt greatly honored of course, let alone a sly sense of academic resurrection. One ultimate contribution ! And refereed in public too ! My one chance of making the headlines, carried by the wings of your well-deserved fame !

However as I lazily jotted down notes on the banks of Gore Creek, Colorado, last summer –I could not play it by ear, obviously – I was crowded with second thoughts. Why **me** in the first place ? After all, like every other retired professor, I had been through the three main stages of academic life : unbridled enthusiasm, desperate endurance, skeptical serenity. And now I was essentially bent on the management of decline...To the extent that I couldn't any more read the lips of the brooks around me as they babbled their flowrates and overall sound powers into my ears ! I do attend a few seminars and lectures here and there, for sure !...But whenever a bunch of formulas is displayed , I get emotional and just look at them as if they were **reminders** of formulas! So why **me** ? But then of course, the Jet Set, I mean the Acoustics Group, had been aware all along of my major contribution to their disciplin !.. Yes, ages ago, when I was going through the motions of heading our Laboratory, I had added an « A » to its logo.. « A » for Acoustics, LMFA instead of LMF! All right, Geneviève , I **did** qualify !

Still, so much had been said previously by key figures from all walks about someone whose legacy had, rightly, already been carved in concrete, that of the Centre Acoustique ! Could I possibly add anything new- assuming there was any point in newness when the old was so good ? Except perhaps for a semantic foray into the denomination of the Acoustics building...Centre Acoustique rather than Centre **d'**Acoustique ? Odd enough !... One more conundrum that lay beyond my ken !... There always remained the deeper Geneviève, obviously...Which did not seep out very much, though . She's not exactly a regular onion, Ladies and Gentlemen, Dear Colleagues, and I did not dare peel so much as the outer skin! Eventually I was only left with her bulky CV to hang on to : its size sent me swaying. I skipped the usual padding only to rediscover an incredible list of publications, reports, books, invitations, decorations, awards... Isn't it amazing how much gets solved by some people during their careers, with all the electronic junk that blights their lives ? Doesn't it support Mark Twain's admiring realization that in Science , « one gets such wholesale returns of conjecture out of such a trifling investment of fact. »

Well, I was in dire straits anyway and I finally thought you wouldn't mind a fresh look at your résumé, based on the teachings of unwritten History and my own dwindling memory. It's no easy task though to winnow facts from past impressions, so I hope you will let me off if a few events here and there are misrepresented.

So let's start from scratch, that is in 4004 BC at midnight, Garden of Eden time, according to one William Eyre, some long forgotten fellow of Emmanuel College, Cambridge, around 5604...when God bludgeoned our Destiny into shape !

You are all familiar with the first sound-bite ever, « Let there be Sound », only to be found in those recent and well-documented renderings of the Good Book whose authors articulate the correct version of the Truth, not in the nerdy editions, based on corrupt manuscripts and botched translations whose publicity for Light has misled former generations for so long !..Light, Light, my God, that's a piece of nonsense !.. Did He ever want to be seen ? Anything but !... Just heard ! .. Besides, what's the metaphor for Creation ? Big Lightning ?? No !... Big Bang ! So you see ! It all ties up neatly !

Well, God separated the Silence from the Sound and except for a few thunderclaps of his own or a few wars for the entertainment of humans, it all started as Music, you know the sort – exquisitely filtered and manicured sound that, according to Euler, in the 1700's, provided a form of spiritual pleasure derived from the perception of order without weariness of mind. And the Sound was good, as God had crowed ! No wonder ! ..Until it branched off into a clutter of dissonant frequencies, a kind of mangled Sound called Noise, like roaring aircraft relentlessly crisscrossing His Kingdom, let alone the lacerating barrages of death metal and gangsta rap soaring up to the sky. One day as He was lying sprawled across a cloud, completely spent, He went off the deep end and summoned Archangel Gabriel :

-Look, Gaby , I'm pissed off ! I can't put up with this pandemonium any longer ! **You** take immediate action or you'll need to have me certified any time soon !

-How about earplugs, my Lord ?

-Come on! I have them on constantly.. They'll knock off some 30dB's, no more !

-Well, with all due respect, my Lord, it's unfortunate you didn't think about it much earlier !...But look ! Why don't we just go back to square zero ? A touch of this acoustic time-reversal that's so trendy these days, down below..And here you are !

God snapped at Gabriel :

-Time-reversal, my eye ! Even **I** can't change the past !...Listen, things've got so bad that it's time for an overhaul of our scientific policy, of cosmic proportions. Noise Prediction and Control ! That's going to be our motto !

-Granted, my Lord ! But the greatest geniuses, Pythagoras, Newton, D'Alembert, Fourier, Rayleigh, just name them...

God wheeled around :

-Geniuses !.. Wait a minute !.. They liked their sound to be tamed, too much ! Not gone wild !.. They binged on vibrating strings and the like but Noise never was very high on their research agenda. All academics are the same, take it from me ! They don't want the real world to burst in on their musings !

-I beg to differ, my Lord ! Noise is Hell, you know ! Piecing together scenarios about noise generation is like looking at the moon through the wrong end of the telescope, so I'm told !

-That's the point, Gaby !..Noise has the fingerprints of the Devil's dirty-tricks department all over it ! That has probably scared all your geniuses off !

-Except for Lighthill, not very long ago !..Must have been bewitched by the majestic vagueness of the topic, as it were !

-Lighthill, uh,uh ? Is that the conjurer who fiddled with Navier-Stokes' equations and turned them into D'Alembert's ?

-Exactly, My Lord, and dubbed all unwelcome terms he was shoving to the right hand side « acoustic sources » !..

-Brilliant ! Iffy too ! He just skated over a few inconvenient details and left you and me holding the baby ! Having to shadow his sources, bogus and real alike ! Some brainwave indeed !

-You want to be fair with him, my Lord ! Navier and Stokes, dull scientists that they were, tell us what the world is like, while Sir James, who was a cut above and an artist at that, tells us how we feel about it. Hence his sources which seem all the more precious since they might be a figment of his imagination!

God who had been drumming his fingers on his thighs was left unfazed:

-And so what ? No smoking gun, eh ? I loathe uncertainty..

Poor Gabriel was nonplussed :

-But what do you make of the emotional supplement he brings in ? Is that not a stroke of genius ?

-I could not care less ! Stop waxing poetic , will you ? It sucks.

God fell silent for a moment and went on :

-Lighthill gave it a try, that's to his credit, granted !.. Well then, let's take it from where he left off.

-Yes , my Lord !

-Before I hire anybody however, why don't you do a bit of headhunting first and track down some smart, competent people, good at everything ! No missing slots ! Substantive people too, who get on with it and do the right thing instead of expending energy on figuring out how to do the most popular thing..No more than a handful !... And among them, a woman ! They're more determined ! ..On you go !

Gabriel flew off and back in less than no time.

-What's the smug smile for ?

God asked as soon as he had landed.

-Well, I googled out a few names, which should more than fit your requirements, My Lord ! And guess what, a woman, too ! One Geneviève Comte-Bellot !..Ever heard of her ?

-Uh,uh ! Yes, it rings a bell !..Isn't she the reckless one who, back in 5960,would keep poking her hot wires through the veil of order which I try to hold taut over the chaos of nature below and the turbulent eddies spilling out of its satanic churn?

-She's the one ! Certainly not your type of human, my Lord, I agree ! You like them a bit less promethean , but in the circumstances , we need to be realistic if we want to break that stalemate !..Besides, on a more intimate note, I'm told she sat on Charles de Gaulle's lap in the past when she was a kid!

God gave a start :

-On de Gaulle's lap ?..Something must have rubbed off on her, then !..All, right, I'll buy it ! Let's have her on board !

When faced with a choice between the now and the later, Geneviève would always go for the now and as soon as Gabriel broached flow noise with her, she did not miss such a window of opportunity. She immediately committed herself to unravelling the mysteries of its generation. For fear she should stick her neck out too far, Gabriel, who knew better, kindly ventured a word of caution, which was shrugged off in no cryptic terms :

-It's money from home !..Want a bet ?... Watch me !

That's how you entered the fray, Geneviève, and by the same token relieved Gabriel of his lingering anxiety as to your motivation : you'd give God a run for his money , all right !

The next thing I knew, you had hand-picked a task-force of up-and-coming young people, smart and ambitious, but not burdened by unchecked egos, as reliable as dynamos. Like magic ! You had even been offered a huge anechoic room wrapped in a brand new building, let alone the requisite paraphernalia : microphones, fast Fourier transformers and whatnot,..Every single morning, around ten, in your cafeteria, you would treat your close-knit community to madeleines to help them remember that Pope and Huxley had both been wrong, that the proper study of mankind was neither man nor books, but acoustics. You would pamper them, tug their heartstrings, radiating benevolence...A ritual meant to create a sense of peaceful and mystical groupness among people eager to share the experience, which by the way still hovers over the hallowed premisses of the Centre Acoustique, 40 years and 20 believers later. After coffee break, they would unblinkingly set off for uncharted near or farfields with their acoustic telescopes and have a field day source-watching, ready, should one show up, to ensnare it in a maze of cross-correlations. Trading exclusively on Lighthill's analogy however proved too slow and unless you could line up serendipity, they would never blaze a trail fast enough. At least that's my guess, since as soon as a new generation of powerful computers appeared, you opened a second front resting on CFD- the only game in town nowadays- which you had become smitten with in the meantime. Of course, launching such a two-prong attack meant a lot more manpower and financial means,..But logistics-wise,

along the years, you had honed a well-proven technique of your own. You would relentlessly snow official bodies under a spate of impeccably-documented applications and reports, let alone expose the unacceptable tyranny of all other departments in the course of presentations peppered with « petit peu's », « peut-être's » and conditionals which hardly toned down the message. Under STP conditions, decision makers would go bananas and eventually surrender. Once in a blue moon, only if you'd drawn a blank, you would report to the Director of the laboratory with your wishlist and ask him to tide you over... Provided he did not mess with acoustics, of course ! Joking apart, Geneviève, this second front proved extremely successful. Glossing over details, your group, in a very short time, made a great leap forward and predicted the noise generated by some jet flow using the full 3-D compressible, unsteady Navier Stokes equations and their boundary conditions. They had done away with the sources ! Well, that's what I thought until last week when I bumped into God, sorry I mean Gabriel, as I was roaming around the Centre Acoustique. You must have been playing hookey that day !... He badly needed your final report. I introduced myself and offered your apologies.

- Any idea where they stand ? he asked curtly.

-Yes !... Chances are there's no sources ! They have constantly kept tabs, though, on near fields where they are supposed to pop up!

The chilling news came to him as a bolt from the blue :

-So Lighthill was wrong after all ?... Was it all a big con ? he muttered

- Anybody's guess ! God knows !.. Didn't I read He hated living in the unknown ? But then, why did He cook up quantum physics? Maybe that's what happens here ?...Sources that only exist if you listen to them !

Gabriel was oozing anxiety . I patted his wings and went on :

- There's no cause for concern here ! I am glad to inform you that they pulled it off ! They **are** able to predict noise, regardless !

-Fine but how about delivering a crushing blow to noise ?... Is that sheer wishful thinking ?

He was trying to draw me out on noise control but I stonewalled :

-Well I know precious little about this particular issue...I understand they have made some progress, but I'm not well up into what they achieved exactly.

Gabriel started fidgeting around, embarrassingly, his eyes sweeping the room as if in search of hidden microphones and suddenly whispered :

-Predicting, understanding, fathoming...I know the feeling, all too well ! And – that's strictly off the record of course- if it were up to me, I'd let them do it for the hell of it. But the Lord's cast of mind has become so doggedly utilitarian these days...He's past caring about primal questions. He badly needs solace !

I immediately rushed to your rescue, Geneviève !

-That's a tall order !How do you bump off decibels when there's no source to target ?.. Unless you make them up ?..

-Yeh, that's the rub !Well, sooner you than me!.. Let me report to God and I'll get back to you very soon.

Whereupon Gabriel took off. I did not hear from him until he paid me a visit this morning and asked me to speak to you on his behalf. The message roughly goes like this. God fully appreciates your and your crew's great achievements and dedication. Your cutting-edge research has earned you unstinted celestial praise on top of your international reputation on earth. But the Lord is sorry your huge scientific contribution is somewhat short on noise reduction. However He obviously pines for a woman of your stature and he is willing to renew your contract for as long as you wish on condition that you buckle down on dramatically lulling the din. But then, anything else has to be put on the backburner, right ?... How's that for a boon ?.. Let me second-guess !... You'll probably muse : « Eternity ahead of

me, that's always something! But, how about money ? »... I can't be way off the mark !..Well, I've got the answer to that one.. And it's a flat NO ! No earmarked funds ! After the crisis, God unfortunately found himself saddled with such liabilities as will tie him to his desk until the Day of Reckoning..So you see, where financial support is concerned, you're on your own.. Our Lord however offered a suggestion. Are you aware of these classified military programs subjecting detainees to protracted noise, volume up full – like heavy metal, Pratt and Whitney's concertos and soforth.. ? Well the self-appointed artists who compose such earsplitting pieces **themselves** have formed an association, called ZerodB, whose goal is to ban this practice, called music torture. Why don't you hop on their bandwagon? There's a lot of dough to be raked from this new program that's managed by Massive Attack and other groups, so God says !

Warmest Congratulations again, Geneviève ! I wish you godspeed !

Ladies and Gentlemen, Dear Colleagues, this is the end of my own erratic search for lost sources, which seem to be constantly standing in the way of sound instead of generating it, but before I take questions, let me add a further remark ! By now you should all share my view that Acoustics, is more a state of mind than a science...And what but a madeleine can best capture a state of mind ?.. Here's a whole bag of them , Geneviève, baked by my wife- so many small sources of inspiration for you !

Ecully, le 13/10/09