

T O N G

— ABOUT WINE —

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CHAMPAGNE

A delicate balance BY STEVE CHARTERS MW⁰² — Champagne's credibility gap BY TOM STEVENSON⁰⁹ — Single vineyard champagnes BY ESSI AVELLAN MW¹⁸ — Autolysis BY HERVÉ ALEXANDRE²⁸ — The science behind the bubbles BY GÉRARD LIGER-BELAIR, RÉGIS GOUGEON & PHILIPPE SCHMITT-KOPPLIN³⁶ — A quest for the best BY PASCAL AGRAPART⁴⁴

CHAMPAGNE'S SWEET SECRET

Champagne is a fantastic wine. No other wine, even if it costs over a thousand euros a bottle, can rival its image. Despite competition from Spain's cava and other sparkling wines from around the world, champagne soars on regardless.

Perhaps one of its inherent strengths, as Steve Charters points out in his article, is that the sales of champagne are so closely linked to global economic factors. Although sales slowed down in 2008 and 2009, it looks certain they will rise when our economies pick up again.

And yet, despite brilliant marketing, Champagne has many obstacles to face over the next 10 years. There's the revision of the appellation; the growing trend for single vineyard champagnes; and the concomitant "rise of the grower." On the other hand, houses and cooperatives have never been so demanding and are monopolising the champagne market both in and outside Champagne. It is they in particular that are clamouring for a revision.

What about the growing demand for Extra Brut and Brut Nature champagnes? There are two reasons for this. Better educated consumers are looking for more individuality in wine. And there's a move towards transparent products, as a part of the healthier lifestyle the media is marketing.

Many champagne connoisseurs, like Essi Avellan and Tom Stevenson, say that low- or non-dosaged champagnes are often too harsh and thin. Pascal Agrapart in his article offers an explanation for this: Brut Nature and Extra Brut need top-quality grapes to guarantee perfect base wines that will give the champagne more natural body.

And this is one of the problems Champagne faces. It is not one of the world's most effective wine-growing regions. Although every grower has to harvest manually, the emphasis is still on mass production rather than quality control. Until recently, for instance, in the winter Champagne's soil

could take on a strange blue colouring. A closer look revealed that this faint blue gloss was due to shredded garbage bags from Paris in the compost bought to fertilise the vineyards. Not every grower used it, of course, and luckily this "urban" compost is now forbidden.

But if still too few growers are concerned with quality control in the vineyard, in my view this is not only because most of them sell their grapes to cooperatives or houses, but also because champagne is a wine boosted with sugar to give it more body, and a blended product. Champagne is in fact a diluted wine, not only in the sense that 3 to 6% of its volume consists of sugar (*chaptalisation*, *liqueur de tirage* and *liqueur d'expédition*), but also that it no longer has a direct relationship with its detailed geographic origins.

In that respect, I believe the big champagne houses are over-emphasising the blending of grape varieties, villages and vintages so as to assure the continuity of their house style. To talk about blending emphasises the craftsmanship of the cellar master, and the powerful role of *liqueur d'expédition* is rarely mentioned.

The aromatic and structural influence of *liqueur d'expédition* is at its most powerful immediately after disgorgement. It needs time to blend in and diminishes with age in the bottle, although the so-called Maillard reaction between the wine's amino acids and the sugar from the liqueur leads to ripe but delicate honey and caramel tones during bottle ageing. But few big brand champagnes are made to age and most of them are drunk within a year or two after disgorgement. So – put simply – sugar is quite an important component in champagne. And, to conclude, if the overall quality of the grapes would go up, the levels of *expédition* could go down.

Filip Verheyden
Editor & publisher



A DELICATE BALANCE

— BY STEVE CHARTERS MW, FRANCE —

The English (and perhaps even most of the Anglo-Saxon world) tend to see history as a long, slow, evolutionary process – a result, perhaps, of their conviction that political history and therefore democracy began with the Magna Carta and ended with universal suffrage in 1928.

The graph on the previous page shows the development of champagne exports since the Second World War. For the Champenois and their accountants, it's a beautiful sight – but what it also clearly reveals is that international wine sales are linked to world economic factors: 30 years of post-war growth; the first and second oil crises in 1973-74 and 1980-82 and substantial problems (particularly in the UK and US property markets) in 1991-94. The 2001 dip is exaggerated by the aberrantly high growth in sales before 2000.

The boom since 2001 has been fuelled essentially by solid performance in the major importing countries (in the UK, shipments rose from 25 million bottles to just over 39 million in 2007), together with dramatic increases in consumption in new markets. The cases of China and Russia are regularly referred to as examples of this but there are others. In 2007 countries as diverse as Angola, Argentina, New Zealand, Slovenia and the Ukraine all recorded imports increasing by over 70% on the previous year.

The sustained growth in export markets – with a record 332 million bottles shipped in 2007 both in France and the rest of the world – brought its share of problems. Essentially all of the 34,000 hectares demarcated within the appellation are now planted (an increase of 33% since 1980), and the maximum yield has also increased from an average of 10,480 kilos per hectare during the 1970s to 13,100 kilos for the first nine years of the current decade. This is compounded by the fact that as a combined result of the French fiscal regime and growers' desire to constitute personal stocks to increase their retirement income, it has been suggested that growers are reducing the volume of grapes they are selling to the houses.

The problems with grape supply and some of the resulting responses are familiar. Before the crisis it was projected that by some time between 2011 and 2015 demand would exceed supply; according to the retail banking group *Crédit Agricole*, even in the current economic climate that could occur between 2013 and 2018. The best-known proposal to deal with this is the suggested revision of the area of the appellation (which Tom Stevenson writes about in his article). It is worth noting, however, that although this proposal originally came from the growers' union *SGV* in the early years of this decade, research suggests that the growers themselves are widely suspicious of it, suggesting it's in the interest of the houses as a way to reinforce their power.

Another result of the buoyant champagne market is its effect on local land prices. When I travel into work I see vineyards adjoining arable land used for sugar beet or wheat; the former is worth, on average, around €850,000 per hectare,

the latter about 1% of that, some €6-8000. Less than two years ago, in the *Sézanne* region south of the *Côte des Blancs*, a plot would sell for the equivalent of €1.5 million per hectare. The value of vineyard land has effectively doubled since 2002, which makes it even harder now for new entrants to get into the business, and – publicly at least – the houses are no longer interested in supplementing their land holdings.

While for many years there was substantial good news on the sales front, some developments were more worrying. For many years in Germany, sales have grown less buoyant; from an average of around 18 million bottles per year in the mid-1990s shipments have declined to around 12 million. German-speaking Switzerland, likewise, suggests that champagne sales may be reducing in favour of prosecco. If, in some markets, consumers are deserting champagne at a time of international success that is a disquieting trend, challenging the established position of the wine as the key marker of success, celebration and seduction. Additionally, it is clear that the first hints of the coming problems were evident before mid 2008. Crucially, shipments to the United States declined in 2007 by 6.2% – a reflection of waning confidence among distributors as much as weakening sales.

As the following table shows, nine of the top 10 markets have imported less champagne in 2008 than in 2009. Interestingly the market that actually improved is one very closely linked to the Chinese economy – Australia, a major supplier to China of minerals and primary material.

	Destination		% change 2008-09
1	UK	35.984.574	-7.86%
2	US	17.193.526	-20.85%
3	GERMANY	11.573.597	-10.38%
4	ITALY	9.910.581	-0.40%
5	BELGIUM	9.438.811	-8.78%
6	JAPAN	8.332.233	-9.14%
7	SWITZERLAND	5.439.009	-10.36%
8	SPAIN	4.090.505	-10.54%
9	AUSTRALIA	3.648.022	10.25%
10	NETHERLANDS	3.511.889	-13.97%

The 10 major export markets for champagne

The shift from excessive demand to excessive supply has seen a transformation of the outlook in the region from one of exultation to a mood of doom and gloom. Shipments reduced by 4.76% in 2008, and further in 2009. For the first nine months of this year the number of bottles leaving the cellars has declined by 17% over the same period the previous year. Of course most sales tend to be made in the last three months of the year – but things aren't looking good at present.

CHAMPA-
GNE'S
CREDIBILITY
GAP

— BY TOM STEVENSON, UK —



THE 2003 PLAN TO RE-ZONE CHAMPAGNE'S VINEYARDS WAS INITIALLY A HUSH-HUSH AFFAIR. UNTIL RECENTLY, THE NAMES OF THE EXPERTS TAKING PART IN IT WERE UNKNOWN AND THEIR PROCEEDINGS KEPT QUIET. FRANCE'S INSTITUT NATIONAL DES APPELLATIONS D'ORIGINE (INAO), THE BODY IN CHARGE OF REGULATING CONTROLLED PLACE NAMES, PUT TOGETHER A COMMITTEE OF FIVE EXPERTS TO EXAMINE A POSSIBLE INCREASE IN THE NUMBER OF VILLAGES WHERE CHAMPAGNE CAN BE MADE, AS WELL AS THEIR "ZONE DE L'ÉLABORATION", THE AREA WHERE CHAMPAGNE MAY LEGALLY BE PRODUCED.

Based in Britain, wine writer Tom Stevenson needs no introduction. He is a world authority on champagne, and has written extensively on the subject for the last 30 years. His most important work is *Christie's World Encyclopedia of Champagne & Sparkling Wine*, first published in 1998.

Those experts, who we now know, are historian Claudine Wolikow, geographer Marcel Bazin, geologist Michel Laurain, agronomist Dominique Moncomble and phytosociologist Stéphane Thévenin. Only one of them is actually from the Champagne region. Their decisions are currently undergoing a legal inquiry.

According to many local people, the production region of Champagne could easily be expanded by as much as 10,000 hectare, a conviction I find puzzling. My own estimations set things at somewhere between 1,200 and 5,000 hectares of land suitable for the production of good-quality champagne in the proposed 40 "new" villages that are to become part of the AOC (Appellation d'Origine Contrôlée). Those figures are admittedly a guess, but they are based on solid evidence. I looked at current usage in the villages right next to the proposed new ones and extrapolated from there. Some 5,000 hectares would create €6 billion in new wealth because the most suitable land for viticulture is the least suitable

for any other form of agriculture. The cheapest farmland in the region costs from €1,800 in the Haute-Marne to €4,000 in the Marne. On the other hand, the most recent sale of modest, not *grand cru*, AOC Champagne land was in Bethon, where it went for €1.2 million. If all these people are right about the 10,000 hectares, then the potential for new wealth is not €6 billion but €12 billion.

MYSTERY VOTE

The champagne houses are all singing from the same hymn sheet, and if there is one chorus I have heard more than any other, it is that the growers in general, and the Syndicat Général des Vignerons (SGV) in particular, are pushing for this expansion. This in theory is true. SGV presented INAO with a formal request for expansion after a vote at the association's general assembly of April 9, 2003, when the motion was carried by 393 votes to 25.

ESSI AVELLAN'S FAVORITE SINGLE VINEYARD CHAMPAGNES

PHILIPPONNAT Clos des Goisses

This plot is so remarkable that it can produce wine worthy of the name nearly every year. It is approximately a 70/30 blend of Pinot Noir and Chardonnay. The high ripeness level of the grapes allows them to avoid malolactic fermentation. Clos des Goisses is a genuinely long-lived champagne and it is one that also needs time, so patience is required.

BILLECART-SALMON Clos Saint Hilaire

Billecart-Salmon clearly followed the Krug model with its launch of Clos Saint Hilaire from the 1995 vintage. It is a monumental wine in which the Billecart style is strongly present. This Pinot Noir from their back garden has so much body and power to it that it feels immortal. Do try to keep some back to enjoy it mature.

KRUG Clos d'Ambonnay

Intriguing wine, which feels almost chewable at entry but whose acidity lifts the palate and leaves an amazingly fresh finish. The Krug house style dominates over the terroir, as it does for Clos du Mesnil. The Krug style is at its best with muscular red varieties, and this pure Pinot Noir has a fair chance of surpassing Clos du Mesnil both in quality and consistency.

TAITTINGER Les Folies de la Marquetterie Taittinger's concept with Les Folies is very different from the above-mentioned grandes marques wines. The Chardonnay dominant blend is made from the vineyards surrounding the House's original acquisition, Château de la Marquetterie in Pierry. Its unique style deriving from partial vinification and ageing in large oak vats complements the Taittinger range. Pricing under the house's vintage makes it one of the best single vineyard purchases.

JACQUESSON Dizy Corne Bautray

Jacquesson is a great spokesman for the concept of single vineyard wines. After the 1996 vintage, they replaced their prestige cuvée with a series of single vineyard champagnes, which they produce only when the natural conditions are right. I have found Corne Bautray Blanc de Blancs from the high-lying vineyard in Dizy to be fascinating, a transparent terroir wine with a unique character.

LARMANDIER-BERNIER Terre de Vertus

Larmandier-Bernier's wines are true terroir wines. Biodynamic methods and non-dosed nature work well in their wines of impeccable fruit purity and

ripeness. Terre de Vertus is actually dual vineyard wine as it is made from two plots that are right next to each other. All the grapes are from a single vintage, but it is not labelled as a vintage because it is launched on the market too early. It can be somewhat austere at youth but a year's post-disgorgement ageing perfects it.

JÉRÔME PRÉVOST La Closerie Les Béguines Jérôme Prévost's concept is peculiar. He basically makes one wine only, a 100 percent Pinot Meunier from his vineyard in Gueux. It is a single vintage wine but not labelled as such due to the young release age. Old vines' Pinot Meunier works surprisingly well on its own and bottle age brings out the vinosity and full complexity. This one has quickly acquired cult status.

CÉDRIC BOUCHARD

Roses de Jeanne La Haute-Lemblé

A newcomer in the single vineyard forum is Cédric Bouchard from Aube, whose vinous style with lower pressure than normal is unique. La Haute-Lemblé 100 percent Chardonnay is my personal favourite. The 0.118-hectare vineyard yields 500-800 bottles a year, so it is almost impossible to find.

CHARTOGNE-TAILLET Les Barres

An exciting new launch from Chartogne-Taillet of Massif Saint-Thierry's Merfy. The Pinot Meunier is ungrafted and Alexandre Chartogne takes every measure to maximise its terroir effect. He ferments the wine with natural yeast sourced from the same parcel. A voluptuous and vinous champagne.

TARLANT

Tarlant produces three single vineyard champagnes. Cuvée La Vigne d'Antan, a 100 percent Chardonnay from Les Sables vineyard, is made from near-extinct ungrafted vines. The sandy soil and more than 40-year-old vines produce a rich and vinous wine with a strong character. At youth, the old oak used for fermentation and maturation plays a noticeable role. Very much a wine, this too should be given some bottle age.



AUTO- LYSIS

— BY HERVÉ ALEXANDRE, FRANCE —

Champagne or for that matter any sparkling wine made according to the traditional method must ferment successively twice.

The first fermentation transforms grape must into base wine, but the second fermentation is what really matters: it happens in the bottle and increases alcoholic content (with 1.2 to 1.3% abv) as well as internal bottle pressure (up to 5-7 atmospheres).



Figure 1. Champagne cork popping out of a bottle; the cloud of fog above the bottleneck appears clearly (© Jacques Honvault).

BUBBLE NUCLEATION

A close study of glasses that have just been filled with champagne reveals that most of the bubble nucleation sites are located on preexisting gas cavities. These cavities are trapped inside hollow, more or less cylindrical cellulose-fibre-made structures measuring some 100 μm long with a cavity mouth of several micrometres. Figure 2 shows a typical fibre acting as a bubble nucleation¹ site.

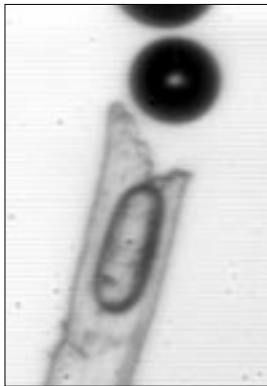


Figure 2. A typical cellulose fibre absorbed on the wall of a glass poured with champagne; clearly visible is the gas pocket trapped inside the fibre's cavity that causes bubble formation (© Gérard Liger-Belair/Cédric Voisin).

Flutes that have been towel-dried just before serving display an excess of bubble nucleation sites, and thus an excess of effervescence. Some of the particles that act as bubble nucleation sites (most of them including cellulose fibres) may detach themselves from the glass wall to eventually immerse themselves into the rest of the champagne. Yet these particles remain active (in terms of bubbling capacity), provided a gas pocket with a radius of curvature larger than the critical radius has been trapped within them. These particles immersed in the champagne bulk produce those easily-recognisable bubble trains, which seem to dance erratically inside the glass while you taste the champagne. These suspended particles are called *fliers* (due to their often complex and circling tra-

1. "bubble nucleation" is the scientific term for "bubble birth".

jectories in the champagne bulk.) *Fliers* are a significant source of bubbles in glasses poured with champagne. The photograph of a typical flute filled with champagne displayed in Figure 3a shows a detail in Figure 3b, in which you can identify some *fliers*.



Figure 3. Photograph of a typical flute poured with champagne (a), and close-up of particles acting as bubble nucleation sites floating freely in the bulk of the flute (called *fliers*), thus creating those charming bubble trains in motion in the champagne bulk (b) (© Alain Cornu/Collection CIVC).

BUBBLE RISE

After their birth on cellulose debris, it is buoyancy that brings the bubbles to the liquid surface. As they rise, they go on developing by continuously absorbing the carbon dioxide molecules dissolved in the liquid "matrix". Bubbles thus steadily accelerate along their way through the champagne. High-speed photographs show this acceleration in the steadily increasing space between the bubbles of a particular bubble train (see Figure 4.)

Tasters of champagne and sparkling wine are traditionally concerned with the size of the bubbles (there is a saying that the smaller the bubbles, the better the wine), which explains why so much attention is devoted to modelling the average size of ascending bubbles. Recent calculations have shown that the final average size of ascending bubbles is however the result of a hugely complex interplay between several parameters.

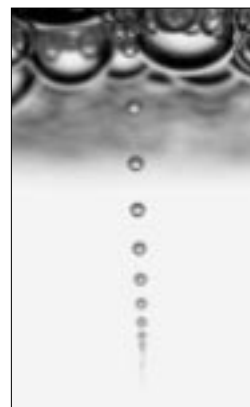


Figure 4. Characteristic bubble train promoted by the repetitive bubble formation process from a single cellulose fibre; bubbles are clearly seen developing as they rise (© Gérard Liger-Belair).

