

Truffle Wars

CLOSE TO THE TOP OF A MOUNTAIN, high above the town of Yongsheng in China's Yunnan province, a man in a suit scrapes away at the forest floor around the base of a pine tree. He is being watched by assorted senior Chinese academics and a healthy cross-section of the world's top edible-mushroom scientists. A significant number of hangers-on, including me, clusters around. This warm, wet, forested region bordering Tibet, Myanmar, Laos, and Vietnam lies at the heart of China's truffle country, and the man is looking for truffles—Chinese truffles, that is, a close relative of the French black truffle that grows in the loose soil around pine trees. We have come here before the season really hits its stride, but as honored guests we must be shown truffles, even though they are not yet fully ripe, as we see by the reddish tinge to their black, warty skin.¹ Unripe Chinese truffles are a bit like water chestnuts: crunchy and without much flavor. Still, we will be served them for dinner. Although many truffle fanciers contend that even ripe Chinese truffles are not wonderful, that hasn't stopped the Chinese from changing the face of the global truffle business over the last fifteen years and bringing new wealth to the peasants living in these mountains.

Each winter, between one and two hundred metric tons of Chinese truffles—principally *Tuber indicum*, but with some other closely related species mixed in—are exported around the world. Leaving Yunnan at seven to fifteen dollars per pound, they are sent to the world's truffle wholesalers, where they acquire some cachet, marketing, and markup. The latter will be considerable. Last winter's Chinese crop sold in the United States for up to eighty-five dollars a pound wholesale, four hundred dollars retail. Meanwhile, the French black truffle was available wholesale at twelve to fourteen hundred dollars per pound, up to twenty-eight hundred dollars retail. And therein lies the secret of the Chinese truffle's success. It looks the same as the French black, *Tuber melanosporum*, but is available in quantity and therefore costs a lot less. Although it doesn't have the same powerful aroma or strong flavor, it's a close

approximation, and that is enough to have won it a substantial niche in the global market.

Truffles are the underground fruiting bodies of fungi that grow in symbiosis with the root systems of trees. The relationship between fungus and plant is complex and close. The fine filigree of fungal threads—the mycelium—greatly extends the root system of the tree, giving the plant access to nutrients and water. In return, the tree gives the fungus sugars it manufactures in its leaves. Technically, it's an obligate symbiosis: the plant needs the fungus, and

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the fungus needs the plant. Ninety percent of the world's plant species require some kind of mycorrhizal (fungus-root) association.

Truffles have evolved the characteristics that appeal to gourmets precisely because they grow underground. Most mushrooms pop up from the forest floor and cast their spores to the wind, but truffles have developed a more targeted reproductive strategy. Their subterranean fruiting bodies manufacture a range of aroma compounds designed to attract animals, from insects and beetles to wild pigs and deer. After animals devour the truffles, the spores pass through their digestive systems unharmed and are distributed around the forest in little packages of rich nutrients. The allure of ripe truffles works just as effectively on us: nature has designed them to be irresistible.



Until Chinese truffles arrived on the scene, European truffles dominated world markets and fine cuisine. For the French and for chefs cooking in the French tradition, the finest truffle is the Périgord black truffle, *Tuber melanosporum*. The Italian diaspora venerates the Italian or Piedmont white truffle, *Tuber magnatum*. Both cuisines regard the summer or Burgundy truffle, *Tuber aestivum*, as a poor second, but it is available in much greater quantities and at lower prices, so it is widely used. A few other truffles have significant local markets in Europe and North America, but until the 1990s the big three dominated the global truffle trade.

Truffles have a reputation for being expensive, and the Italian white is the most expensive of the lot. *Tuber magnatum* is only found in any quantity in parts of northern and central Italy and Croatia,² but even under optimal conditions demand exceeds production, so prices remain high. In a poor early season caused by a hot, dry summer last year, run-of-the-mill Italian whites were fetching up to three thousand dollars per pound. At a charity auction in fall 2007 the Hong Kong gambling entrepreneur Stanley Ho paid three hundred and thirty thousand dollars for an Italian white truffle weighing three pounds five ounces—the largest found in the last fifty years.³

The Périgord black truffle is produced over a larger area, from Italy through France and into Spain, but in this case, too, total production in a good year is measured only in a

few tens of tons, and prices of six hundred and eighty dollars per pound are common—especially around Christmas, when every self-respecting French gourmet wants a few truffles for a festive feast. Around the turn of the twentieth century, during the golden age of French truffles, annual production in France regularly exceeded one thousand tons, and fortunes were made in previously poor rural areas. The truffle villages around Cahors in the Périgord still boast large houses that were built during this first truffle boom.⁴ But over the last one hundred years French production has dropped steeply, a consequence of aging plantations, rural depopulation, and changes in forest management that have reduced the wild harvest. The discovery in the 1950s and 1960s that *melanosporum* was widely distributed in the mountainous regions of central Spain offset the decline somewhat, but despite the development of improved techniques for establishing *truffières* (truffle orchards) and the planting of hundreds of thousands of truffle trees over the last thirty years, production has, at best, stabilized at a low level. In recent years, a succession of hot summers in central France has further depressed harvests and led to worry on the part of truffle growers that climate change is now adding to their woes.

Enter *Tuber indicum*. Until the 1980s the truffles indigenous to Yunnan and neighboring Sichuan province in southern China were appreciated only by the people in the



Above: *The mushroom market in Chuxiong, Yunnan, China.*

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remote valleys where they grow. Noting that truffles were being traded in local markets, Chinese mycologists began to describe their characteristics. By the early 1990s news of these intriguing new species had reached Europe, and a few enterprising Frenchmen began importing them to meet the demand created by the shortfall in European production.

It is very hard to tell the difference between a Chinese truffle and a Périgord black.⁵ If a Chinese truffle should happen to spend some time in close proximity to a good, ripe example of its French cousin, it will soak up the smell and be all but impossible to distinguish. Add the practice in some French truffle markets of selling unwashed truffles in small sacks or bags—sight unseen—and the temptation becomes obvious. Truffles would arrive in France as *Tuber indicum* at one hundred and fifty francs per kilo (about thirty-five dollars) and overnight be transmuted into prime French *melanosporum*, worth about twenty-five hundred francs (nearly six hundred dollars). It is thought that in the 1994–1995 season, imports were roughly double French production, and virtually none were sold as “Chinese” truffles. Not surprisingly, a scandal erupted in French truffle circles, which particularly upset truffle growers and harvesters, who

could see their premium product being rapidly devalued. Less scrupulous chefs welcomed the opportunity to pay a lot less for a truffle, and they certainly did not disclose the origins of the fungus on their menus. A mix of European and Asiatic truffles was then re-exported around the world, and unsuspecting restaurateurs found themselves paying top price for a disappointing product.

At this point, I should perhaps explain why eating perfectly ripe, fresh truffles is so highly regarded. As noted earlier, the truffle has evolved to attract animals. *Tuber melanosporum* does this by producing at least fifty different aroma compounds—a marvelously complex mixture that has both power and subtlety.⁶ It responds to *terroir*—that mixture of soil and climate (and, in the case of truffles, host tree) in the same way that a grape expresses the location in which it was grown. The truffle has both perfume—the penetrating but beguiling and attractive smell that first hits the nose—and flavor—its own characteristic taste, as well as the taste that it brings to the food to which it is married.

A truffle is transformative, capable of turning an ordinary egg into a feast. It provides a perfect example of the power of smell to affect and imprint on memory. Furthermore, its earthiness and directness appeal to emotion and affection, which is one reason that truffles have acquired a reputation as aphrodisiacs. An unripe truffle, a less-than-perfect truffle, or a less impressive species of truffle cannot deliver the same effect. Though not worthless, such truffles are worth less, precisely because they are only a pale shadow of what tradition and classic cuisine deem the real thing.

Research has unlocked the mysteries of the aroma compounds produced by truffles, and it is now possible to create a cocktail of chemical compounds that mimics their aroma and flavor. But because commercial truffle flavorings use only a small subset of the full range of the chemicals found in nature,⁷ the sensation they produce is a cartoon version of the real thing: all bright colors and loud noises, instantly recognizable, the culinary equivalent of cheap aftershave. Yet even though commercial flavoring is a parody, no substitute for the full truffle experience, restaurateurs who would not dream of serving their customers canned asparagus are content to serve ersatz truffle.

The commercialization of truffle aroma began with a product used for training truffle dogs (its only acceptable use, in my view⁸), but it soon spread into “truffle” oils and beyond,⁹ into a wide range of truffle-flavored products that have never been anywhere near a fresh truffle of any kind. To make the products impressive when the bottle is opened, the dosage of flavoring needs to be high. You can buy truffle “aroma” by the quart. I have seen “truffled” balsamic vinegar. I would not use it.

Significantly, the spread of the new “truffle” oils coincided with the emergence of Chinese truffles on the world market. It became, and remains, commonplace for chefs—even very good ones who should know better—to use “truffle” oils to give a hit of flavor to fresh truffles that are either unripe or not as powerful as they should be.¹⁰ In Anthony Bourdain’s memorable phrase, truffle oil has become “the tomato ketchup of the middle class.”¹¹

In this new world of truffles, the Chinese product no longer causes scandal. These truffles are (mostly) traded for what they are—a less expensive alternative to the Périgord black truffle, but you will not find them described that way on many menus. Chinese truffles have become assimilated into global trade; in terms of volume they almost certainly constitute most of the world’s traffic in truffles. Yet some significant downsides have accompanied their arrival. One is the risk that the truffle experience will be misunderstood and diluted. If a diner is disappointed in a truffle dish

or—worse—thinks that truffle oil is all there is to truffles, then the real thing—expensive and still rare—is also devalued. In France and Italy, where truffles are a key feature of regional and national cuisine, that risk is probably small, but beyond those borders a lack of sufficient experience—by chefs who have never really learned how to work with or to appreciate the subtleties of the fungi and by diners who don’t know what an excellent truffle is—diminishes their reputation. Worse, perhaps, is the danger that if *Tuber indicum* were to become established in commercial *truffières* around the world, it could reduce production of the real thing. *Tuber indicum* has already been found in the Piedmont region of northern Italy, a direct consequence of the difficulty of telling the two species apart when inoculating trees for truffle production.

But there are also upsides, and a hint of considerable potential. The people of Yunnan and Sichuan have found a crop they can exploit, which brings them significant income even though the prices they receive are not high. Harvesting truffles gives them a reason to manage their forests sustainably, to resist the temptation to cut trees down for firewood or building materials. Their gathering provides employment and helps to stem the flow of people into the cities.

There is also scope for considerable improvement in the quality of the truffles harvested, which could mean more money for the harvesters and better-quality truffles on tables around the world. Reliable witnesses report that a perfectly ripe Chinese truffle is the equal of its French cousin, although very few reach the West in that condition. My tour of Yunnan was far too early in the season for me to judge their ultimate potential, especially since the truffle harvester I observed sifted through the forest floor with a pick and rake to recover any and all truffles, with no concern for their maturity or flavor. Because there is no market premium for quality, Chinese harvesters take everything. The French, Italian, and Spanish truffle growers who gather *Tuber melanosporum* and other European truffles when they reach full maturity would think them mad.

At maturity, truffles have maximum aroma and flavor, and a shelf life (with careful storage) of ten days to two weeks. Truffles that are not fully ripe are less valuable: to dig them up early is to throw money away. Growers and harvesters teach dogs to guide them to the ripe truffles,¹² which makes a well-trained dog with a good nose a highly prized possession. When truffle people gather, the talk inevitably turns to dogs. The vagaries of the human-animal relationship are always interesting, made more piquant for truffle harvesters by their complete reliance on the dog for income. Although China has no tradition of using animals

for harvesting truffles, there is some interest in exploring the possibility. Truffle researchers at the Kunming Institute of Botany, in Yunnan, are considering a trial use of dogs, but it will take many years—perhaps decades—before they have any real impact on the quality of truffles leaving China. If the Chinese can be persuaded to use dogs, the quality of their truffle crop will improve immediately, but it will have to be matched by a better price in the market to encourage the use of dogs on a wide scale.

The decline of truffle production in Europe has sparked attempts to grow European truffles around the world. In North America, trees inoculated with the Périgord black truffle have been planted in many parts of the West Coast, from British Columbia through Oregon to California, and major planting is under way in North Carolina and Tennessee. In the southern hemisphere, black truffles are being grown in New Zealand and Australia, and a few trial plantations have appeared in Chile and South Africa. The truffle season south of the equator is six months out of phase with that of Europe, so fresh, ripe *Tuber melanosporum* is now available on the global market during the northern hemisphere summer—a time when only preserved truffles or fresh summer truffles have previously been available.

Over the next decade the world trade in truffles, already transformed by the arrival of *Tuber indicum*, will become less strictly seasonal.¹³ The French black truffle will make two appearances—during its normal northern hemisphere winter, and again during the summer harvest in New Zealand and Australia. Summer truffles will be available in winter, and spring truffles in fall. If the quality of Chinese truffles can be improved, chefs will be able to work with fresh product year round, and therein lies a real challenge.

If the food business looks at this new world of truffles and attempts to shoehorn it into the familiar French/Italian, black/white dichotomies—cooking tournedos Rossini with black truffles and shaving all whites onto pasta—a vast range of gustatory potential will be lost. The complexity and variety in the aromas and flavors of other truffles are worth exploring for their own sake.¹⁴ We need to recognize that intensity is not necessarily the same as excellence. Summer truffles are much milder than their winter cousins but are cheaper and can be eaten in greater quantity. Attempting to pass them for French blacks by dosing a dish with artificial “truffle” oil should be recognized as culinary fraud. By contrast, celebrating the freshness and diversity of the truffles of the world will create new dishes and new traditions, and strengthen the best of the old. I will still eat my first Périgord black truffle of the winter season in the Provençal

manner: in a simple *brouillade* of truffled scrambled eggs, with a glass of red wine and some good sourdough bread. But I will also look forward to finding out just how good Chinese truffles can be. ☺

FURTHER READING

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Hall, Ian, Gordon Brown, and Alessandra Zambonelli. *Taming the Truffle*. Portland, OR: Timber Press, 2008.

Renowden, Gareth. *The Truffle Book*. Amberley, NZ: Limestone Hills Publishing, 2005.

Rocchia, Jean-Marie. *Des truffes en général, et de la rabasse en particulier*. Rev. ed. Avignon: Éditions A. Barthélemy, 1995. Published in English as *Truffles: The Black Diamond and Other Kinds*. Avignon: Éditions A. Barthélemy, 1995.

NOTES

1. This is also a characteristic of unripe French black truffles.
2. The most famous region is Piedmont, where the town of Alba is regarded as the capital of the white truffle. However, the truffles in the Alba market come from all over the country.
3. There has always been a tradition of auctioning off the few, very large Italian white truffles that turn up every year—it makes for good publicity. In recent years the winning bids have tended to come from wealthy Chinese businessmen, who use the truffles to impress guests at enormous banquets.
4. The same thing is happening today in China. Around Xianghe Li-la (Shangri La), near the Yunnan border with Tibet, export of the *matsutake* mushroom (*Tricholoma matsutake*) to Japan is bringing new wealth to the population.
5. Even when using a microscope to examine spores, it is difficult to tell the two species apart. In Europe, DNA techniques to spot *indicum* have been developed by trading-standards authorities.
6. One of the most important chemicals is DMS, dimethyl sulfide, the odorant that gives cooked cabbage its smell.
7. Look for “truffle aroma/arôme de truffe/truffle essence” on the label of truffle oils, *pâtés*, salts, etc.
8. Although I do have a soft spot for a dash of truffle oil on fries.
9. There are, to the best of my knowledge, no widely available “natural” truffle oils. They are expensive to make and less immediately impressive on the nose than the artificial concoctions.
10. For a good overview of the use and misuse of truffle oil in the United States, see Daniel Patterson, De Gustibus, *New York Times*, 16 May 2007, at www.nytimes.com/2007/05/16/dining/16truf.html?ei=5124&en=1f35ed4e1a199e88&ex=1336968000&partner=permalink&expod=permalink&pagewanted=all.
11. See www.guardian.co.uk/theguardian/2004/oct/06/features11.g21.
12. In France it was traditional to use pigs, in the days when every French peasant had his own, but dogs are universally preferred today. They are easier to fit into the back of a Citroën Deux Chevaux.
13. The little town of Aqualagna in the Marche region of central Italy claims to be able to provide fresh truffles in every season, from the *Tuber borchii*, known as the *bianchetto*, in spring, through summer truffles and on to the glories of the Italian white in the fall and the French black in the winter. This may be stretching the truth a little, however, especially in late winter.
14. The Oregon black truffle, *Leucangium carthusianum*, is much prized by chefs in the Pacific Northwest, even though it is harvested with rakes. It has aromas of pineapple and fruit and is a surprisingly good ingredient in desserts.