International Honey Market

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- **A Point of Inflection or turning point has been reached in global honey prices.**
- **The incentive to produce pure honey is being restored.**
- **More powerful and sophisticated scientific techniques and a more comprehensive global data base to assess the adulteration and circumvention of honey are being developed.**
- **The integration of the incentives to produce and consume honey is approaching.**

Introduction

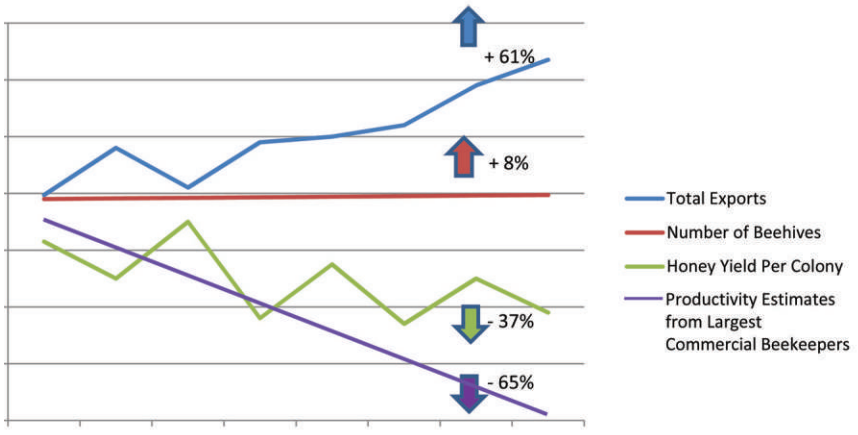
The need to achieve a Point of Inflection in honey prices after 2 years of sharp declines in prices is universally recognized by all fair-minded members of the industry. The incentive for beekeepers to produce honey will collapse if a Point of Inflection is not reached imminently. Later in this article you will see several bar graphs illustrative of the price declines over the past 2 years. We quantify the percentages of those declines. We also quantify in this article the shifting quantities and values of exports of honey from major honey exporters to the US market.

In our July report, Dr. Stan Daberkow, formerly of the U.S. Department of Agriculture, provided USDA data regarding the contrast in the collapsing export prices of raw honey and comparatively stable retail prices for honey in the U.S. Dr. Daberkow's data and the reproduced chart illustrate there is more than ample elasticity for raw honey prices to rise. The underlying reasons for the collapse in international and domestic honey prices are indicated by three variables in the graph below from our October 2016 report.

Professor Norberto Garcia, president of the International Organization of Honey Exporters, was a guest speaker at the convention of the National Union of French Beekeepers, and his speech was the subject of a report in a major French newspaper *Le Figaro* on Oct. 30, 2016. He was quoted in *Le Figaro*: "While the number of hives increased in the world by 8% in 2007 to 2013, the export of honey in the world increased by 61%... in the "Oriental" hemisphere –from Ukraine to Taiwan – the trend is even more glaring with an increase of hives of 13% and an explosion of exports by 196%, according to figures from the FAO. These statistics show a shocking anomaly which is completely against the global trends of lower productivity of hives." He also made the following main points regarding the basis of the rapid and unsustainable collapse in international honey prices: 1) The role of adulteration through a variety of sophisticated techniques and 2) the persistent circumvention of honey through clever and shifting schemes. The data before scientists, government officials and independent academic researchers illustrate that the consumption of what is ostensibly pure honey far exceeds the most diligent thorough and informed scientific estimates of the production of honey.

"Very many countries in Europe increased their exports of honey last year.

Chart: Three Variables: Honey Exports, Bee Hives, Productivity per Hive



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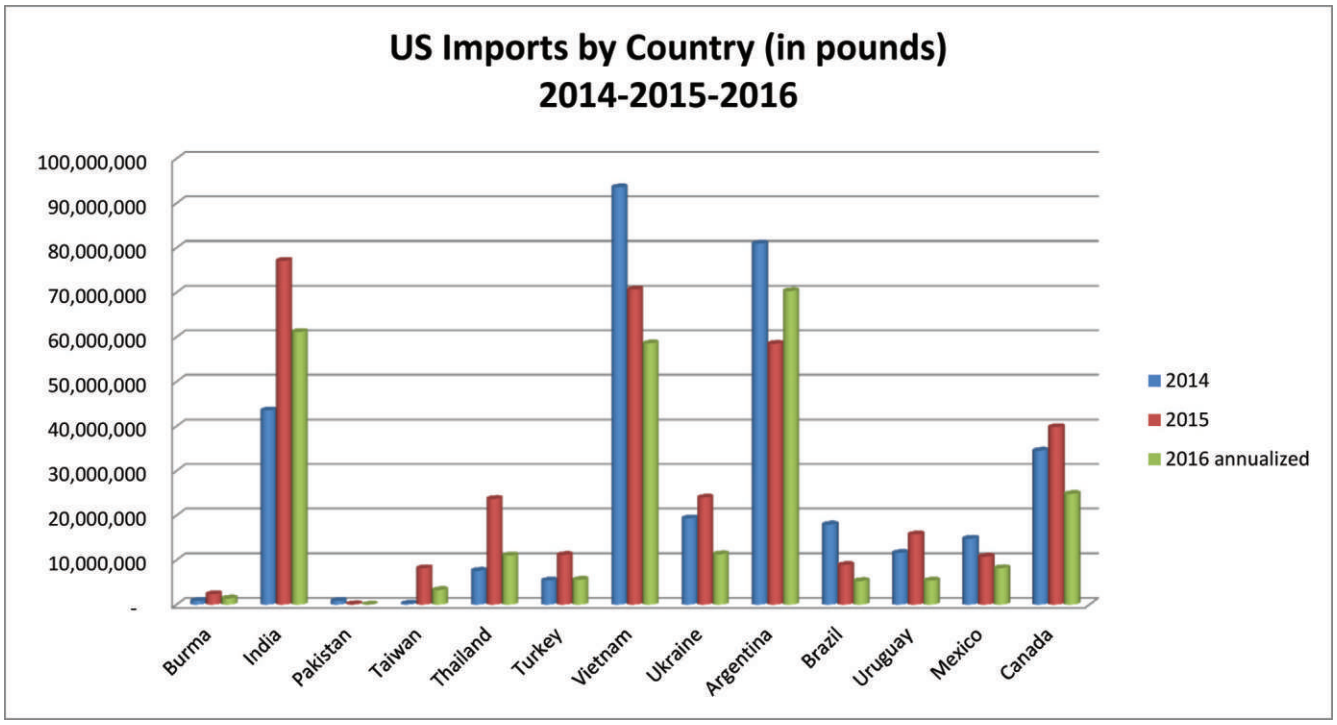
Mr. Phipps is president and founder of CPNA International, Ltd. and is currently on the National Honey Board. He is an importer of honey, natural foods and tea from various international producers. Ron is also the former personal research assistant to the president of the American Philosophy Association. He is a recipient of the National Science Foundation fellowship for philosophy of theoretical physics. His chapter on Integral Philosophy was published in the book *Intuition in Mathematics and Physics* in 2016. Mr. Phipps is a founding member of the Tea & Health Committee, which organized three major scientific symposiums on tea and health and the role of antioxidants in the prevention of disease. He has worked with FDA to develop a research protocol for the global diversity of honey. Currently, Mr. Phipps is president of the Chamber Players International.



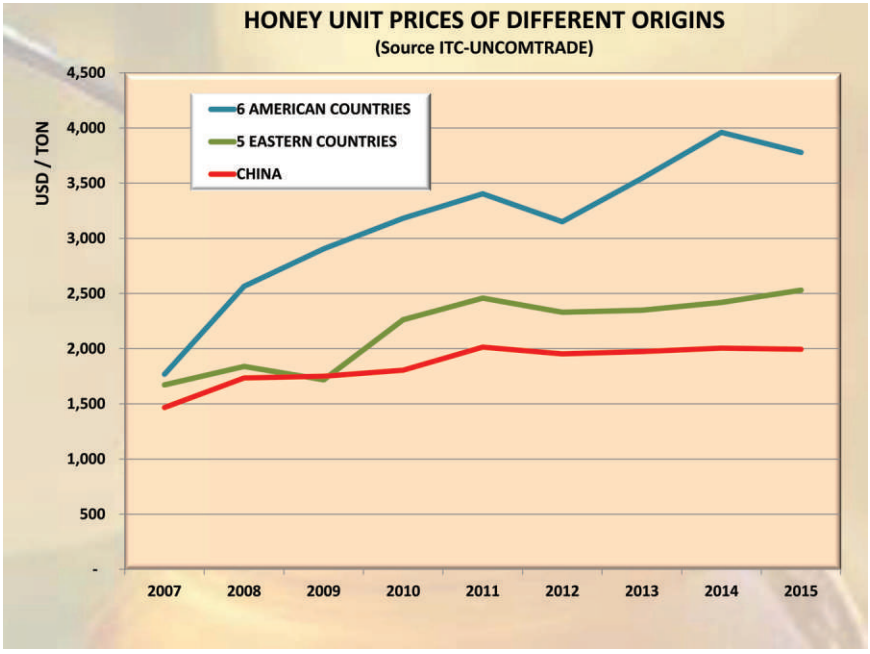
Source: U. S. Department of Commerce, Foreign Trade Statistics

In parallel, they increased their imports from China and the statistics show us that this honey is then re-exported and labeled as local product..the main victims are consumers…it is believed that national authorities should intervene with proven methods such as nuclear magnetic resonance and sharing results of analyses at the global level" added Prof. Garcia, as quoted by *Le Figaro*. Chinese honey production is reported to be 450,000 tons with 150,000 tons exported.

Growth in Global Honey Demand

Since 2010, global honey demand grew at a high rate of 19,504 tons (43,000,000 lbs.)/year, a significant increase over the period 2001-2009 (4,313 tons or 9,500,000 lbs./year). The U.S. led the demand growth at a rate of 12,797 tons (28,200,000 lbs.) year, and demand in Germany and Japan was stable. We note that the current drop in prices for honey cannot be attributed to a decrease in overall demand!

However, as of the end of 3rd quarter 2016, total U.S. honey imports slowed to 122,121 metric tons (269,227,956 lbs.), a decline of 11.5% relative to the same period in 2015 (138,071 metric tons/304,392,777 lbs.).



The Science of Honey

Honey is the by-product of the interactions of zoological and botanical life forms. Many forms of zoological pollination and diverse botanical sources of nectar, pollen, honeydew are involved. From that diversity honey achieves its variety of flavors and colors and textures, which has charmed and captivated humanity from ancient to modern times.

To those bio-chemical and physical interactions nothing can be added nor removed, nor can those interactions artificially be interrupted and suspended. This latter point is relevant to the predominance in certain producing nations of immature honey or "Shui Fu Mei" or Water Honey. Water honey can explode the quantities of "honey" produced, dramatically increase productivity and reduce costs. Such practices have dominated some country's honey industries for at least the past 5 decades.

The consequences of 1) using inadequate or poor science and 2) failing to use more sophisticated and powerful scientific techniques for assessing adulteration and/or circumvention, are judged by many observers of the industry to allow the old foxes to achieve their goal of "permanent residency in the hen house" while the hunters and the hounds remain ignorant and unsuspecting.

A study of honey in the EU, begun in December 2015, showed that 32% of samples from all origins were non-compliant. When the EU's next report is released, it is expected that the percentage of non-compliant results will increase. Once Nuclear Magnetic Resonance (NMR) analysis is applied, an even more dramatic picture of adulterated honey is expected.

The good news is more schemes of

adulteration are being exposed and more sophisticated scientifically accurate methodologies and techniques are being both developed and implemented through increasing collaborative efforts of government, academic and private scientists and laboratories. The EU Beekeepers Association is cooperating with academic researchers in Bayreuth, Germany, to study honey analysis and create an economic model of the honey market. Collaboration links with government, private laboratories and independent academic researchers are forming, which could extend to other nations.

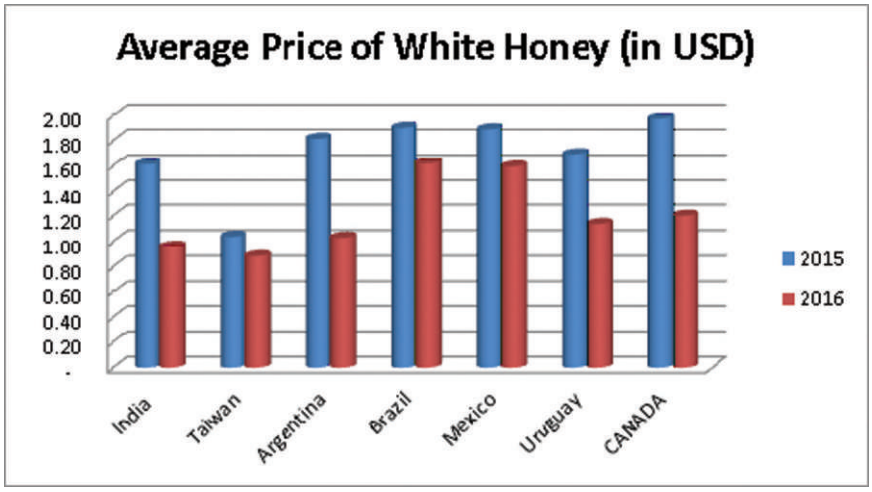
In the Era of Traceability and advanced computerization a new scientific approach to assessing purity, adulteration, contamination and circumvention of honey is being formulated. This approach furthers the discussions I had with the FDA on the "Research Protocol" and with Dr. Joseph Bowden who worked with the USDA. Since biblical times, people have sought to avoid both adulteration and false witness, or in scientific parlance both false positives and false negatives.

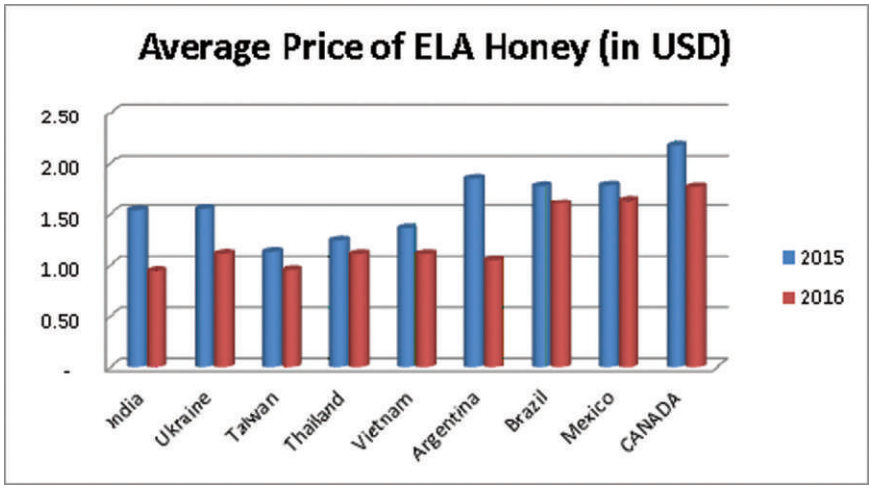
In the case of our charming product that is not so easy since there are so many variables which influence and determine the physical and chemical profiles of the global honey supply. Magic markers were sought, but they remained elusive and often deceptive, leading to both false positives and false negatives. Questions of botanical source, regions of origin, time of production, weather and elevation, extracting processes, blending, extraneous mechanical manipulation, beekeepers, exporters, importers, and packers, are all involved in the global supply of honey purchased and sold. That level of traceability allows the creation of a global data base of chemical and physical profiles of all honeys and blends of honey. Modern computerization, as occurs in particle physics, astrophysics, genetic research, etc., allow those diverse profiles to be easily computerized and centralized. Against that background of scientifically authenticated and original samples, honeys can be analyzed for purity and authenticity. This approach allows the creation of the Gold Standard in analysis, a standard which minimizes false positives, false negatives, uncertainty, and contradictory judgments.

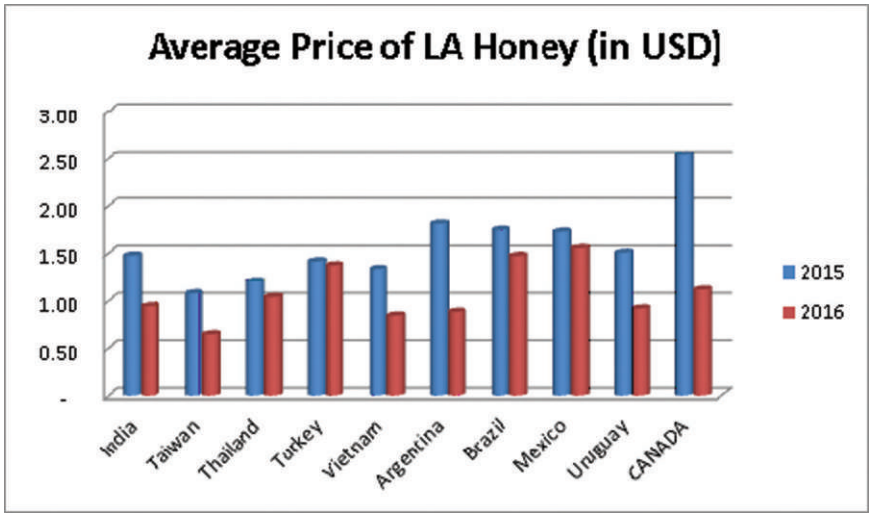
The emergence of the rather universal problem for the global food industry of glyphosate underscores the need to abandon the Mythology of Ultra Purity and establish, based upon good science, reasonable tolerance levels. Neither bees nor plants exist in Domains of Invulnerability to Disease. Realistic tolerance levels must be established based upon solid science and real health risks taking into account Average Daily Intake (ADI) not regulations which are excessive and unrealistic.

India

In 2015, imports from India into the U.S. reached a value of $114,000,000 and quantity of 77,131,000 pounds, making Indian honey imports number one in both value and quantity. This is a remarkable development since 15 years ago India exported virtually no honey to the international honey market and has a population of over 1.3 billion people. This is especially stunning since during the antidumping investigation; India was used as a surrogate country for China. However, there was no record of export from India and the data comparing China, the largest producer and exporter with high levels of productivity, to India led to clearly aberrational conclusions. The calculations, which were based on that data, would imply that the whole world was then, and in subsequent years, dumping honey. As of August, 2016, Indian imports were $38,000,000, down from $70,000,000 for the same period in 2015, and total volume declined to 40,789,000 pounds. From January to August 2016, average prices for Indian honey declined 37% to fall under $1.00. Imports of White and ELA Indian







honey declined in volume in 2016, and Light Amber imports grew.

The main Indian mustard honey crop looks to be short. That crop usually begins in December, but adverse weather has hampered its development. In late 2016, Indian honey exporters were reluctant to buy or sell on a forward basis any significant quantities.

In November, 2016, the Indian economy was in some turmoil because of currency uncertainties, after the recall of certain rupee banknotes by the Indian government to reign in corruption which was generated by the black market for rupees. That black market has contributed to a severe underestimation of India's GDP and a reduction in national tax revenues. "Prime Minister Narendra Modi fired a direct shot at India's endemic corruption with a surprise move on Tuesday to ban the country's largest currency bills, starting [November 9]. The ban is intended both to curb the flow of counterfeit money and to take aim at terrorist organizations…" (Geeta Anand and Hari Kumar, *The New York Times*, Nov. 9, 2016). This problem parallels the two-tiered currency market which plagued Argentina during the final years of the Kirchner presidency. If the banknote recall is successful, then the rupee should strengthen which would increase Indian domestic honey prices.

A special Indian government task force raided a honey-producing company, Apis India Ltd., in connection with alleged trade tax evasion on a huge quantity of illegal sweeteners like glucose. "Raw honey is a non-taxable item and this company is taking advantage of this provision" stated a senior official, as reported by the *Times of India* (September 24, 2016).

Argentina

Argentina remains a major factor in the international honey market, including the American honey market. Argentina has a very mature, experienced and quality-conscious beekeeping and honey-exporting industry. This is a result of several decades of high level scientific work in apiculture that included the training of beekeepers and the meticulous testing of honey. Furthermore, Argentina produces large quantities of White and Extra Light Amber honey whose flavor profiles both mirror and are compatible with the flavor profiles of American honey, including clover, alfalfa, thistle, mesquite, citrus and sunflower. This contrasts with white honey of other origins that crystallizes rapidly and lacks flavor components desirable in the U.S. market.

From January to October of 2016 Argentina exported 70,000 metric tons of honey, with over 20,000 metric tons imported into the U.S. The US received 43.4%, Germany 23%, Japan, Spain and France about 5% each, Belgium 4%, Italy 3%, Saudi Arabia and Switzerland 1.7% each. There were 18 other export destinations. Germany and Japan were paying significantly higher prices than other international buyers. As of November, an additional 15,000 metric tons were sold for export in the December – February period. This means that almost all of the honey of the 2015-2016 crop has been sold, along with the carryover of the preceding crop.

The new 2016-2017 honey crop has been significantly affected by cold temperatures in the spring, and migration of colonies to suitable regions which puts stress on the bees. It is estimated that the reduction of the spring crop will be about 50%. It is premature to predict the summer crop (January – March), but there is considerable caution since the poor conditions in the spring diminish the vigor of the bees. Also, *La Nina* has created dry conditions in many areas which could lead at best to a regular crop and at worst to a poor crop. While a decade ago, Argentina annually produced over 100,000 metric tons of honey, the conversion of pasturelands to soybean production has resulted in normal crops averaging about 60,000 metric tons along with decreased productivity per hive which correlates to increased expenses in production of honey. It is now most probable that the current crop will be below the new normal of 60,000 metric tons.

Domestic prices during the 4th quarter of 2016 increased 15%. This is creating serious dilemmas as the international honey market has rising prices and some Argentine exporters and their import partners have not been able to cover their positions. A similar situation prevails in Brazil relative to pending contracts for organic honey. It is widely expected that the reality of the Argentine honey market in respect to demand and the prices of new offers will have a fundamentally different tenor and reality than that which prevailed for the past 2 years. The demand from Germany and other markets for Argentine honey has increased as cited above. The analysis of adulteration in honey has reached much more sophisticated levels which has diminished the demand on Chinese honey. It has also increased the scrutiny of the purity of various international sources of honey. Argentina with its high quality and quality control standards is a beneficiary of this significantly increased interest from Europe, Japan and North America.

The Argentine honey industry is confident that the next 2 years will be dramatically different and better than the preceding 2 years.

Brazil

Brazil remains the central source of genuine certified organic honey, which is predominantly light amber (about 80-85%), with ELA about 10-15% and white about 5%, depending on weather. The crop from late 2015 to first quarter 2016 was affected by *El Nino* and the heavy rains and floods which reduced production at a time when international demand for organic foods was increasing. There is not enough supply to serve the two large markets, the US and the EU. Agencies of the Ministry of Agriculture held classes on queen rearing, increasing honey production and organic management, and colony numbers have increased for the current crop. The 2016 harvest is beginning slowly due to recent rains, winds reaching 80 miles per hour and cold, but a good harvest is expected in the south.

The price gap between Brazil's organic and specialty honey and conventional honey from other countries is huge. That gap must narrow at some point, either from a decline in organic honey prices or a rise in global prices for conventional honey. There is growing interest in organic honey production in India, Mexico, Uruguay, Argentina and Vietnam, which will introduce new competition in the world for organic honey.

The main lesson is that creative marketing of special high quality honey, like the marketing of premier wines, coffees and teas, results in more remunerative and attractive prices. Brazil is the beneficiary of the Era of Creative Marketing.

Vietnam

In 2015, Vietnam was the second largest exporter of honey, by volume, to the US. The vast majority of the honey was Light Amber, Amber and Dark Amber. A dramatic decline in prices occurred, from an average of $1.34 as of August, 2015, to $0.85/lb. as of August, 2016 (8 months customs value).

This decline reflects not only the overall decline in international honey prices, but the preference in Vietnam of "quantity over quality." The decline in quality is attributed to changes in the main botanical sources from rubber to *Acacia mangium*, both honeydew sources of honey.

While many variables affect the quality, including leaf size, time of production (early or late summer), bee feed, the main issue with *Acacia mangium* is color instability. During the first half of the year (December – May), Vietnam produces honey from coffee, cashew, lychee and a few other main floral sources. During the past 5 years, the predominant botanical source of the honey produced and exported June through November has been *Acacia mangium*.

Vietnam's main destination for honey remains the U.S. market. It is interesting to note that in the post-Vietnam war era, Vietnam received international support to develop its agricultural sector. It is a major global producer of coffee, cashew nuts and black pepper and is now the largest exporter of those three items to Europe, according to Mr. Phil Hogan, commissioner for Agriculture and Rural Development of the EU, who spoke in April 20, 2016, during his visit to Ho Chi Minh City.

Geopolitical relations between the U.S. and Vietnam have significantly improved during the past decade. But those relations are now also fraught with anti-dumping cases, some tangentially involving China. For example, as this report is being composed, the U.S. is investigating the use of Vietnam as a transshipment point for Chinese steel, which is subject to high anti-dumping tariffs. "U.S. firms alleged

the Chinese steel was modified to be corrosion-resistant and then sent to the U.S. at Vietnam's U.S. tariff rate, which is lower than for China…the heart of the issue is whether the steel is modified enough to be a new product made in Vietnam" (David Henry, New York, Reuters, Nov. 2016).

With the imminent failure of the TTP, we anticipate new bilateral agreements between the U.S. and Vietnam will be negotiated.

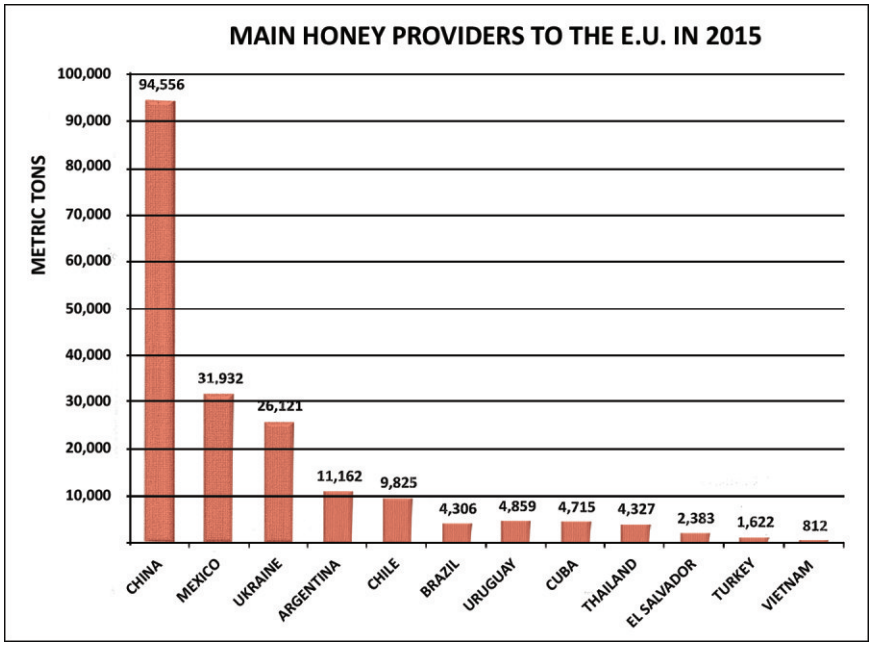
Hopefully the Vietnamese honey industry will put quality first, quantity second and in so doing both attain a fair price for their beekeepers and contribute to the recovery of a more vigorous honey industry by increasing incentives to produce honey.

China

The chart on the right illustrates the predominant role Chinese honey played in 2015 as the largest honey supplier to the EU, with 48.2% of the import market. This dominant role has been jeopardized by the EU honey study which, using traditional analytical methodology, revealed that 32% of samples from all origins were adulterated. The EU honey industry awaits publication of a second study of commercial honey, which is expected to suggest even more severe findings of adulteration.

Use of the nuclear magnetic profile (NMR) methodology, with an expanding global data base of samples, may reveal a much higher amount of adulterated honey. This technique is able to demonstrate not only the addition of extraneous and manipulated sugars, but also the use of both 1) resin technologies to disguise country of origin, remove residues and change darker honey to lighter honey and 2) premature extraction of high moisture honey whose high moisture levels are subsequently artificially reduced by use of a vacuum chamber. The latter technique has been in play in China for at least 5 decades and accounts for 1) the large aggregate quantities of "honey" produced in China, 2) the extraordinary productivity of Chinese beekeepers and 3) the comparatively extremely low cost of production. Such "Water Honey" cannot be regarded as either a natural or a pure product. This is the key point which can not be ignored or accepted by the international honey industry.

European consumers (perhaps with the exception of British consumers) and packers have become increasingly aware of those facts of adulteration. Of great importance is that major European honey retailers are demanding of European honey packers that the honey they buy pass the NMR test. The retailers fear that the use of NMR analysis will reveal adulteration of honey via extraneous sweeteners, the use of resin technology, and/or the practice of producing immature honey. They are very concerned about a very proactive consumer backlash and the harm to the reputation of prominent retailers. This is causing a fundamental change in the landscape of the large European honey industry.



(Source: Prof. Norberto Garcia, UNCOM Trade data)

As Chinese honey exporters have become aware of the burgeoning demand for non-adulterated honey from Europe, a 3-tiered price structure for Chinese honey has been offered, that is, honey that can pass China's tests, honey that can pass traditional carbon isotope ratio (C13) tests and honey that can pass the NMR test. The sales prices for the 3 categories are dramatically different. The prices for honey that can pass NMR testing are high but the quantities available are low. Current prices of Chinese honey that can pass the NMR and Heat-stable Amylase tests are significantly higher than honey from South America and about 40% higher than other Chinese honey. Due to these developments, China's honey exports to Europe declined from about 8,000 tons per month to 4,000 tons per month in 2016. The situation described above will likely cause Chinese authorities, who are facing tremendous and increasing domestic demands for environmental protection, food safety and food security, to re-assess both 1) beekeeping practices and 2) the manipulation of honey by factories. In fact there have been 2 international honey conferences in China the past 2 years to harmonize Chinese honey-producing practices with 1) international demands for purity, quality and authenticity and 2) sophisticated modern technologies to determine purity and origin of honey. In 2016, there were major international conferences regarding Food Safety held in China in which food scientists from the US and elsewhere have participated.

We anticipate that pressure will grow in China to cease exporting and using resin technology on honey and to terminate the production of "water honey" and to allow the complete bio-chemical interaction of bees and their botanical sources in the production of pure, mature and natural honey.

Due to multiple factors it is clear that China will not gain market economy status in the U.S. in December, 2016, as China expected from the bilateral agreement for China's membership in the WTO. This means the use of surrogate country analysis in the U.S. assessment of anti-dumping petitions brought against China will persist. With the changes in the U.S. government in January, 2017, trade tensions with China will likely follow a complex and tortuous path.

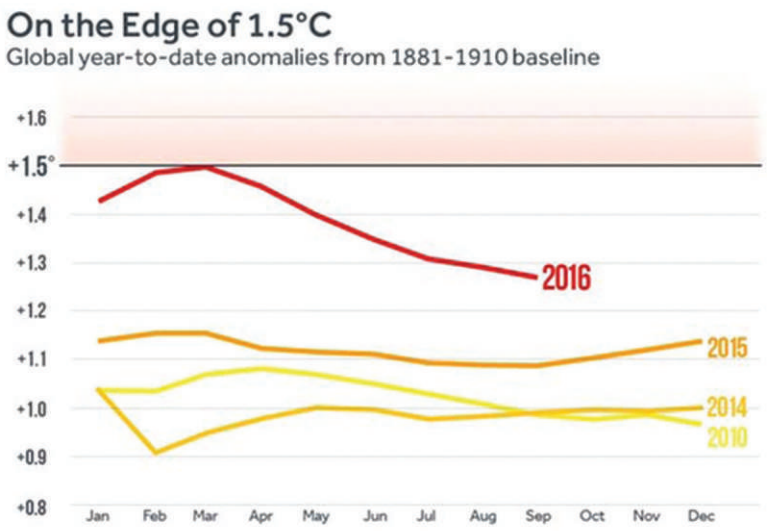
China's direct outside investment (DOI) is exponentially increasing, including in the honey industry. That includes investments in both major honey-consuming countries and third countries linked with circumvention of honey. China's investments are driven by a slowing economy, large capital reserves, non-performing bank loans, and the quest for external markets and foreign sources of minerals, energy and food to assure food security for the large population in China. There are many geopolitical and macroeconomic issues that are being placed upon the bilateral negotiating table.

Conclusion

Interestingly, in the U.S. Congress and agricultural circles there is open interest to restrict outside ownership of strategic resources. Because of the vital role of beekeeping in agricultural production (see the October, 2016, *ABJ*) beekeeping is being elevated to be a "strategic industry." The Plight of the Bees has caused some environmental groups to argue that bees should be classified as an "endangered species."

Climate change and geo-political transitions hover over all global agricultural production and international macroeconomics. The planet continues to warm, sea levels continue to rise. There are shifting patterns of *El Nino* bringing excessive rainfall and floods and *La Nina* provoking droughts and widespread wild fires. Dramatic political changes are increasing in their intensity

Chart: Global Temperature Data from NASA and NOAA



and frequency in South America, Europe, the Middle East, North America and Asia. There are no reliable crystal balls.

What recent scientific evidence established is that 2016 promises to be one of the hottest (if not the hottest) years since Pre-industrial times. Data from NASA and the National Oceanic and Atmospheric Administration indicate that 2016 exhibits record Arctic sea levels. "2016 is set to be the hottest year on record by a significant margin, with temperatures that are 2.2° F (1.2° C) above pre-industrial times, the World Meteorological Organization told diplomats gathered in Marrakech, Morocco, to discuss international action to limit global warming to less than 2° C by the end of the century" (Andrea Thompson, Climate Central, Nov. 15, 2016). Parts of the Arctic in Russia have suffered temperatures 11-13 degrees F. higher than the average temperatures from 1961-1990.

The general expectation for the short term is that *La Nina* will result in higher temperatures and drought is the southern areas already suffering drought and in cool, wetter weather patterns in the north.

If the combination of 1) more powerful and sophisticated technologies for assessing adulteration and 2) climate change and other environmental factors reducing both total production and productivity/hive of honey manifest themselves during 2017 and 2018, it will become crystal clear that a new Point of Inflection (turning point) has indeed been reached.