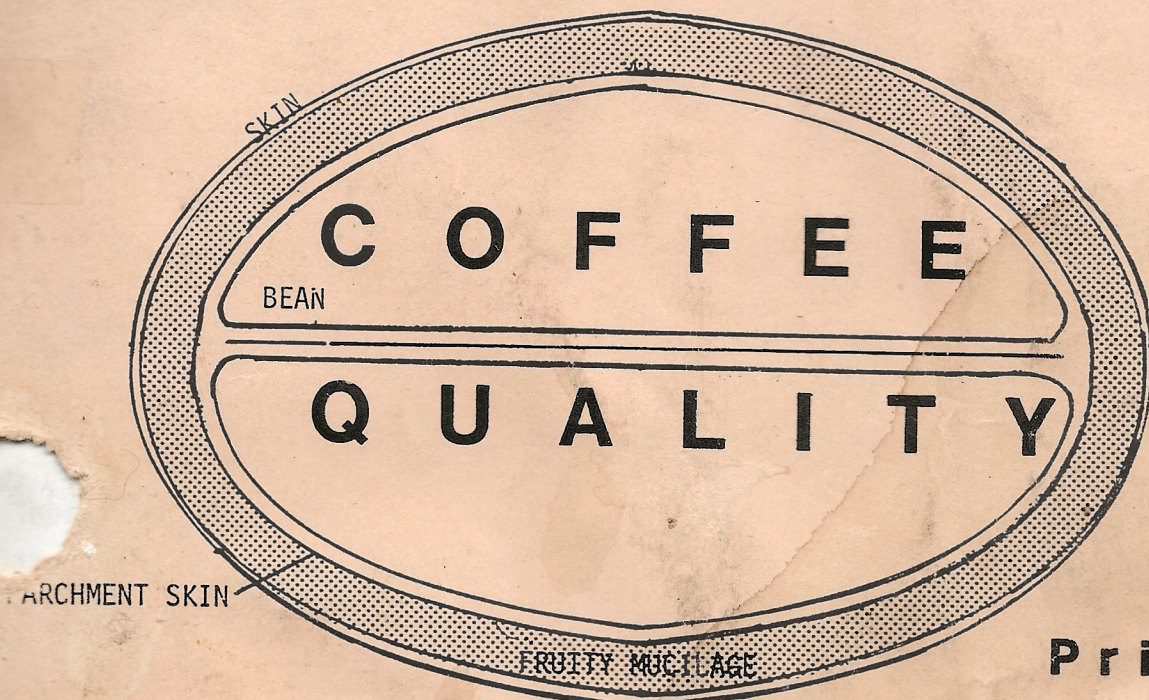


Sivetz



Primer

CHERRY

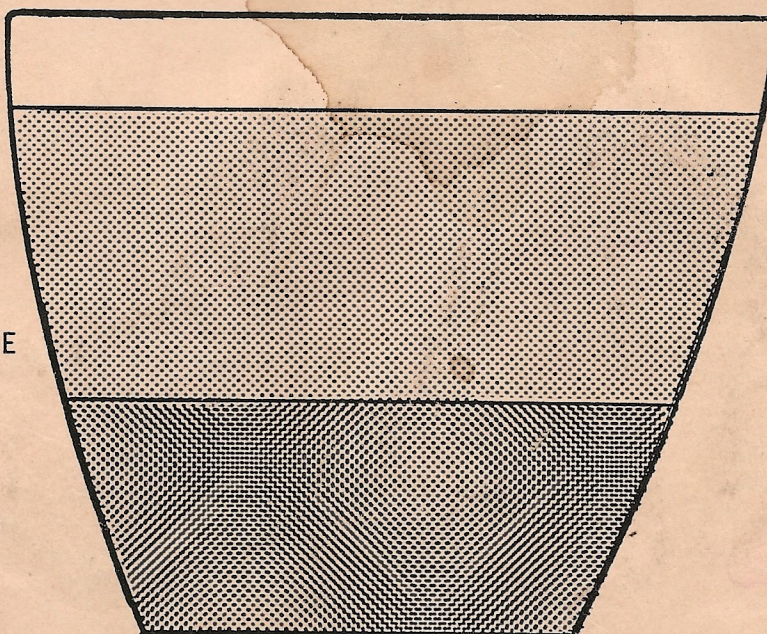
>75 Million Bags (60 Kg)/yr export

World Cup

1/6 BEST TASTING
ARABICAS

1/2 MEDIOCRE
TASTING
CUPS of COFFEE

1/3 WORST TASTING
ROBUSTAS



A 100 PAGE CRITIQUE
ON HOW TO
TO OBTAIN A SATISFACTORY TASTING CUP OF COFFEE

1987



Revised '89, '90, & 4'91 & 2'93; 6'93, '94 & '95

Coffee is not bought or consumed for nutrition. It may be purchased by bag, pound or cup, but weight (the quantity measure) has value only insofar as it has acceptable flavor (the intensity measure). Coffee has only one value: to give the consumer pleasure and satisfaction through flavor, aroma and desirable physiological and psychological effects.

Michael Sivetz

BASIC QUESTIONS:

1. WHY IS THERE SO MUCH BAD TASTING COFFEE SERVED ?
2. WHY IS THERE SO LITTLE COFFEE INFORMATION FOR THE CONSUMER ?

BASIC RIGHTS:

1. A MAN SHOULD KNOW WHAT HE IS DRINKING.
2. THERE SHOULD BE A PACKAGING LAW ...requiring the declaration
 - a) % ROBUSTA, BRAZILS & ARABICAS IN THE BLEND.
 - b) % WATER IN THE ROAST & GROUND COFFEE.
 - c) % DEFECTIVE BEANS USED

Words of Wisdom

There is no one who does not eat or drink,
but few there are who know flavor. CONFUCIUS

A hungry man does not distinguish LATIN

TO KNOW THE THING TO BE MEASURED,
YOU MUST KNOW THE SCALE. INDIA SANSKRIT



A CRITIQUE ON CAUSES OF DECLINE OF:



COFFEE QUALITY

by Michael Sivetz, Ba. & Ma. Science in
Chemical Engineering
COFFEE CONSULTANT
Manufacturer of Roasting Machinery

with 35 years industrial and commercial experiences
in the coffee industry worldwide

Outline

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8,9	2. ORIGINS OF QUALITY COFFEES
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P r e f a c e

This is not your ordinary "run of the mill" coffee booklet extolling romantic places and recipes. The purpose of this booklet is to tell you why you are in a market that sells bad tasting coffees and improper brewing equipment. And why the public's revulsion to the supermarket's bad tasting coffee, is revealing itself as less per capita consumption, and a proliferation of small retail roasting shops, many of which roast on premises.

The bibliography provided will show you the way to technical, commercial, historical aspects of coffee growth and use, but this booklet will tell about the politics and unsavory commercialization, if not exploitation, that goes on day after day, year after year (for decades) by the most prominent and largest coffee roasters and their trade association, and even the coffee trade journals. Yes they are all intimidated by the large corporate buying power of the G.F.'s and P & G's in the USA and in

Europe, with their counterparts.

No honest accounting of the world coffee trade can be given without the realization, and a strong appreciation, of how politics in the coffee growing countries influences pricings, plantings and destructive export taxes.

The coffee exporting and importing countries are historically and economically tied together through colonial ties, to such an extent that, e.g. France imports most of its coffees from the Ivory Coast in Africa, and so its profile of coffee blends is overwhelmingly Robusta; bad tasting Robusta varieties. Perhaps it is some kind of moral justification that the French, so proud of their culinary skills, should serve such bad tasting coffee, in compensation to the commercial arrangements with their former colonies, e.g. also Cameroun, Madagascar.

In the USA, the major roasters have developed a low priced (and of course low quality) product from the lower grades of Arabica coffees; and since about 1960, have introduced (without public education) a change in their branded blends to more "bad-tasting" Robusta coffees. Simoultaneously these same corporations have had their National Coffee Assoc. fight with money in Wash. D.C. lobbying activity to prevent any action by any government agency to cause them to label their canned coffees as to grade, as to origins and especially as to the fraction of "bad-tasting" Robusta (lower priced) coffees in their blends.

The addition of 8 to 10 % water to roasted coffees is pure fraud unchecked. This last mentioned act is the most insidious and one of the most major betrayals of consumer trust. Due to the silent introduction of a totally different (Robusta) botanical variety into U.S. blends, in the past 30 years, there has occurred a great reduction in the quality of canned and pouched coffees. Due to progressively less acceptable tasting coffees, per capita consumption has fallen from 18 to 12 lb/capita. The fact is that in all these years the U.S. Food & Drug Adm. (FDA), the presumed guardian of the public trust, has not raised a finger to protect the consumer.

This is not oversight, it is negligence. It may not reach the

monetary waste of the military-industrial associations and contracts in the USA, but it never-the-less extracts billions of dollars per year, year after year, from John Doe and gives him bad quality coffees.

The whole scene is further ravaged by the ICO Int'l ^{r.t. 1'89} treaty agreement that the USA and other European nations sign with the coffee growing countries of the world to place minimal prices on a supply & demand system of export quotas and world policing of exports. This arrangement has been going on for over twenty years. It has been, as all control systems are, sooner or later, a continual drag on free commerce. It has further cost the USA and all other consuming countries in the agreement, billions of dollars per year. The logic behind this treaty is that this is a "benevolent subsidy" to the coffee growing countries (paid for by John Doe as a hidden tax). It has in fact been many other things. There have been repeated attempts by the larger coffee growing countries to monopolize the market supply of coffees and to independently drive up the prices, even while these same countries were benefitting from the high prices of the ICO (Int'l Coffee Organization). These countries have not made any effort to upgrade the quality of beans they export.

The blind rush to buy lowest cost inferior quality coffee beans by the major corporations, not only has produced progressively worse tasting coffees, but has oriented the consumer to having to use more milk or cream to overcome the bad taste of what is being marketed. Indeed, I believe, it is clear that this deteriorating quality situation has caused the creation of the GOURMET COFFEE market in the USA to cater to those consumers who cannot stomach the aromaless stale Robusta blends sold by the major roasters. Since about 1975, g.f. and some other roasters have been adding 8% or more water to the R&G coffee canned or bagged. This watering causes more rapid and complete loss of coffee flavor-aromatics, and causes accelerated stale tastes to develop, which tastes can be very offensive. Further, the consumer is paying for 8 wt% water in his supermarket "low-price". Thus water is being sold at the rate of over US\$ 4.00 per lb. This may seem like good business practice to those doing it. To the buyer who is deceived, and is not informed of what he is buying, it is immoral.

No one should believe that the major corporations, especially those in the coffee business, are righteous^g and totally honest in their dealings.

It is human nature for those "who-know-more", as sellers, to take advantage of those who are buyers, the ignorant consumer.

It^{is} well past time for the consumer to assess his relationship to these kinds of coffees and their manufacturers. By educating himself, the consumer will not buy these inferior products, but will strive to buy coffees that are properly identified and give value.

Introduction

We have bad tasting coffee being served all over the USA.

What is served to you on the airlines and institutional restaurants is undrinkable.

What is being sold in most of the cans on supermarket shelves is also undrinkable.

What consequently is being served as coffee at home is also unsatisfactory.

With 35 years commercial and industrial experience in the coffee industry in the USA, in the coffee growing countries and in other consuming countries I'm in the proper position to judge the scale of quality that exists and has existed.

On the other hand the uneducated consumer, who only sees the cans on the shelf and virtually knows little more than that, can be related to a person looking through a knothole in a fence as to his vista of what the business is all about.

The fact that in the USA 2/3 to 3/4 of the consumers drink their coffee with milk or cream, is adequate testimony that the beverage cannot be drunk black. In Canada, Australia and the U.K. over 90% of the coffee is drunk half & half with hot milk, as it is for breakfast over most of Latin America, France, & Europe.

Once milk is used, we now have a coffee flavored milk, another product.

If it were not for milk, instant coffee as manufactured today could hardly be drunk.

One of the most basic problems that the consumer has is that he has no scale of what good tasting coffee is. This initial problem is magnified by the limited scope and content of what is readily available to the consumer as coffee in the market place. IGNORANCE & LIMITED SUPPLY.

These circumstances are enhanced by unjustified glorification of "great tasting" coffee on the TV, which in fact is nearly never executed in commercial practice.

The advertising practices of holding up canned coffee as an index of quality on TV, belies the fact that vacuum canning does not preserve coffee aromatics, and fresh roast flavors, ^{but} hides the nature of the quality of the original beans. Because both good and bad beans are ground beyond discrimination, that different lower grade botanical varieties (Robustas) are widely used, and the introduction of well over 5% water which devastates flavor and robs the consumer of value.

The consumer, the buyer is not without fault. Because the consumer does not understand the coffee product, and has been repeatedly disappointed if not cheated as well; has taken on the attitude that all coffees are the same, and therefore the lowest price is selected as the basis of purchase and use.

But even more serious, the consumer does nothing much to resolve his dilemma. Equally serious is the fact that the corporate roasters do not improve circumstances.

The corporate roasters are far away from the consumer. They are not listening to quality complaints. What they are doing is manipulating the properties of the bad tasting Robusta coffees (lowest priced), and maintaining silence about what they are really producing, aided and abetted by their trade associations and intimidated trade publications.

Equally at fault is the United States Food & Drug Administration that should be protecting the public from fraud and filth in their food products, when they allow the handful of major coffee roasters to use highly defective coffee beans, and Robusta beans, without the need to declare on their cans & high water contents. An inexcusable aspect of this "lack-of-policing", is for the FDA to allow WATERING of the roast and ground coffees, which too is not declared on the package. Whether the FDA has been intimidated by the coffee companies and its trade associations or simply is not doing its job is immaterial. The policing job is not being done and the public is suffering for it.

From the day the coffee seed is planted, until the beverage is consumed, there are repeated manifestations and designs executed, not necessarily for the benefit of the end user, but more usually for the benefit financially of the executor at that stage of commercialization.

It can be the farmer, or his government agency, or the miller, exporter or shipper. It is the importer, roaster, buyer, restaurant owner and operator that also contribute to the diminishment of the quality of the final cup of coffee served.

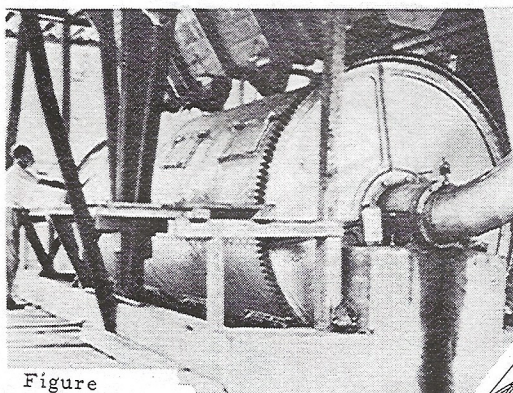
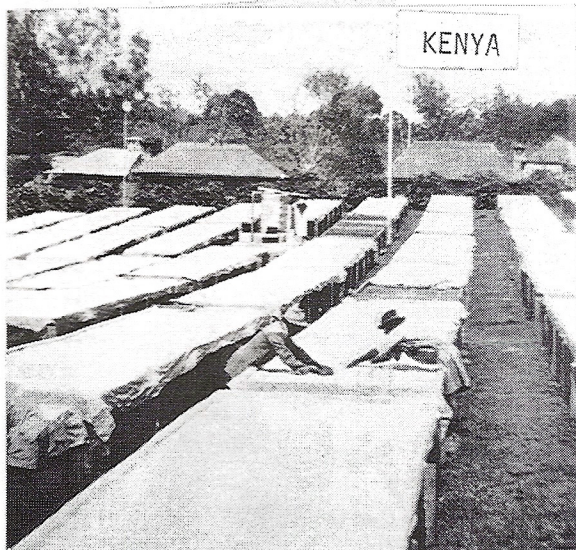
In this booklet, I shall point out how this diminishment occurs at each stage, all the while also illustrating the systematic steps occurring in the coffee trade.

The coffee industry due to its many and varied aspects, is often difficult to understand; and is often difficult to procure information, so as to understand it. Yes there is intended secrecy. Yes there is broad ignorance, misrepresentation or lack of truth. Ignorance is due to lack of knowledge, but it is also due to conveyance of error; hence the multiplication of error by those who receive false or faulty knowledge.

A profitable business that succeeds due to the limitations and lack of knowledge of its customers, breeds secrecy, and the commitment not to pass on useful knowledge. In fact, it is sometimes desirable to support unfounded information, if it is to ones benefit financially, e.g. shortages of green beans due to drought, frost and floods.

Not all these diminishments are sinister, because there are the natural inefficiencies in agriculture, trade and manufacturing. But there are also the natural human traits of greed, self-serving projects, concealments, laziness, and outright misrepresentation and theft. Sometimes well meant projects like the ICO controls of export quotas and world pricings, "back-fire" to cause great inefficiencies, losses and personal hardships.

20 Tray, Patio & Mechanical Drying



Figure

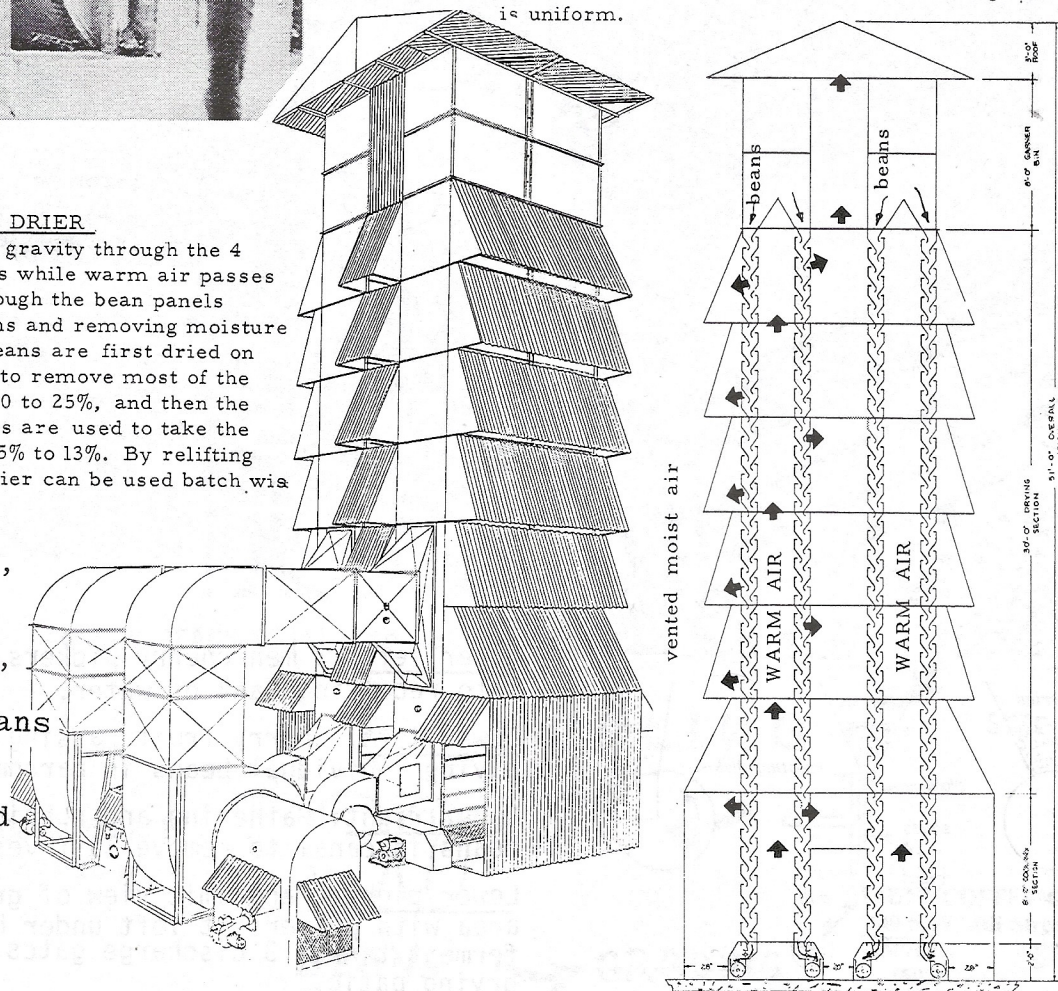
ROTARY WARM AIR MECHANICAL DRIER

When the sun doesn't dry the beans within a week on the patio, and/or if there is excessive beans produced, and insufficient patio space, then a mechanical hot air drier heated with steam or oil combustion can dry the beans in 48 hours with 2 or 3 tempering periods between drying periods. Air drying temperatures seldom exceed 140°F ; if it does the bean quality can be damaged. The rotation of the drum allows the beans to mix so that exposure to the warm gases is uniform.

WARM AIR GRAIN DRIER

The beans fall by gravity through the 4 labyrinth columns while warm air passes horizontally through the bean panels warming the beans and removing moisture. Usually coffee beans are first dried on patios in the sun to remove most of the moisture, e.g. 50 to 25%, and then the mechanical driers are used to take the moisture from 25% to 13%. By relifting the beans, the drier can be used batch wise.

Grain driers use screws & elevators, which break parchment, which causes air flow blockages, and overheating of portions of the beans hence, non uniform drying and not always producing good quality tasting dried beans.



New Botanical Varieties IMPROPER DRYING

MUCH EFFORT HAS BEEN PLACED INTO DEVELOPING NEW STRAINS OF PLANTS THAT ARE RESISTANT TO RUST, CBD Coffee Berry Disease, better tasting e.g. ARABUSTA for the Ivory Coast, and more productive, as e.g. Caturra in COLOMBIA.

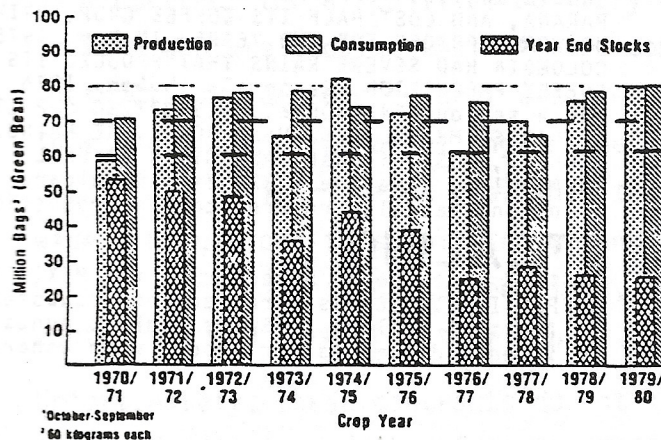
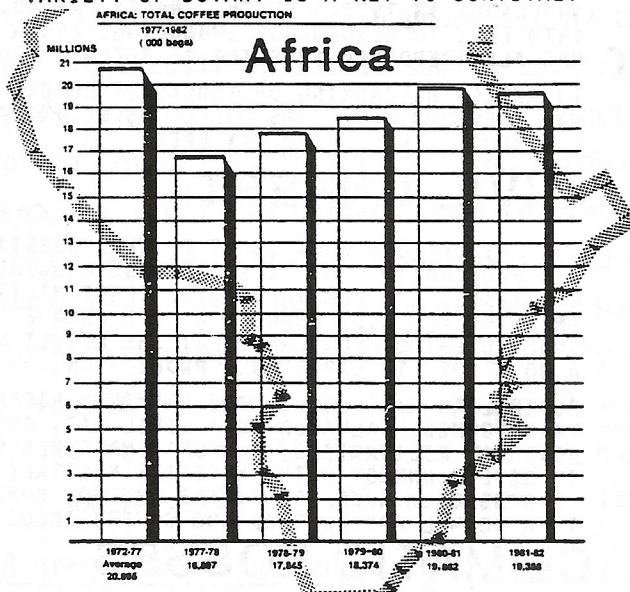
Interestingly enough, washed process Robusta coffee beans taste better than, "naturals" dried in the fruit, yet except for a few places like UGANDA, such process upgrading of the green coffees has not been widely used.

ROBUSTAS ARE BY THEIR NATURE RESISTANT TO THE RUST DISEASE WHICH HAS BEEN SPREADING INTO CENTRAL AMERICA & COLOMBIA.

OBVIOUS ADAPTION METHODS HAVE BEEN USED ELSEWHERE, SUCH AS MOVING BRAZILIAN PARANA PRODUCTION OUT OF THE FREEZING ZONE.

In the Sept. WC&T 1981 an article discusses the potentials for GENETIC ENGINEERING or designing into a plant the characteristics desired. These sorts of things are already being done and are called hybrids.

THE DANGER OF HAVING A SINGLE TYPE BOTANICAL VARIETY, IS THAT DISEASE OR INSECT ATTACK CAN DE-CIMATE A WHOLE CROP AND AREA. HENCE, VARIETY OF BOTANY IS A KEY TO SURVIVAL.



IN THEIR DRIVE TO INDUSTRIALIZE, MANY COFFEE GROWING COUNTRIES HAVE PUT EMPHASIS ON MECHANICAL DRYING OF THE GREEN COFFEE BEANS, RATHER THAN THE SLOW, PATIO SUN DRYING.

SOME UNFORTUNATE RESULTS OF THESE EFFORTS HAS BEEN THE REDUCTION OF unskilled labor, with ACCOMPANYING UN EMPLOYMENT & UNREST.

THE PEOPLE DIRECTING SUCH LARGE, OFTEN GOV'N FINANCED SCHEMES, HAVE NOT NOTICED THE GREAT DOWN GRADING IN FLAVOR THAT SUCH SYSTEMS OFTEN HAVE CAUSED. AN OUTSTANDING EXAMPLE HAS BEEN IN EL SALVADOR, WHERE DOZENS OF LARGE GRAIN TYPE DRIERS WERE INSTALLED ABOUT 1975, AND A GREAT DEAL OF QUALITY DAMAGE HAS OCCURRED TO SALVADORIAN COFFEES. GRAIN DRIERS TEND TO HAVE NON UNIFORM FLOW DUE TO OCCLUSION OF CHAFF, HENCE SOME BEANS ARE OVERHEATED, AND THIS CONSEQUENTLY DOWN GRADES ALL THE QUALITY.

TASTING IN THE FIELD IS NOT SATISFACTORY NOR SKILLED ENOUGH IN TERMS OF BUYING CRITERIA.

OTHER FASTER AND EFFICIENT DRIERS THAT CAN TURN OUT EXCELLANT QUALITY DRIED GREEN BEANS LIKE THE SHIVVER'S, HAVE NOT BEEN WIDELY USED. ONE PROBLEM IS THAT THE DRYING SEASON IS ONLY 3 MONTHS LONG, AND PROCESSORS OR FARMERS DO NOT WANT TO INVEST CAPITAL FOR SUCH SHORT TERM PROCESSES.

ALSO THERE IS THE BUG A BOO OF TRADITION. UNSKILLED IN TECHNOLOGY, THESE GROWING COUNTRY FARMERS & PROCESSORS ARE AFRAID TO INVEST IN NEW FANGLED EQUIPMENT, BUT PREFER TO USE LABOR INTENSIVE LOWER COST, LESS PROPER METHODS AS ARE EVIDENT ALL OVER Brazil, Colombia & elsewhere.

Back in 1975 Sivetz demonstrated fluid bed drying in Hawaii that produced top quality beans at 12% moisture in 3 hours from near 50% moisture. These results were not believed, because the traditional methods take 1 to 2 weeks on the patio with washed coffees, and 36 to 48 hours in old fashion Guardiola driers; whereas "naturals" dried in the skin, like in BRAZIL can take up to 3 weeks on the patio and 3 days in and out of old fashion driers with poor heat transfer and producing mediocre quality beans.

Containers

Since the late 1970's, there has been more and more effort placed by the steamship carriers to place 250 bag lots of green beans into a 25 foot container.

THIS METHOD HAS SOME REAL ADVANTAGES IN THAT STEALING, BAG DAMAGE AND SPILLAGE ARE VIRTUALLY ELIMINATED. HOWEVER, IT IS NECESSARY TO INSTALL MACHINERY ON THE SHIPS TO DEHYDRATE THE RECIRCULATED AIR, IN ORDER NOT TO CAUSE MOIST CONDITIONS AND TO ELIMINATE CONDENSATION.

VARIOUS "kinky" TECHNIQUES HAVE BEEN TRIED SUCH AS : running roof condensate to collectors, adding dehydrating chemicals to chambers, etc. but the safest and the best techniques is where AIR CONDITIONING is controlled in each container.

Coffee - World Production, Consumption and Year End Stocks
Crop Years' 1970/71 - 1979/80

ROASTING GREEN COFFEE BEANS**Roasting**

The roasting of green coffee beans develops the coffee aromas and flavors:

Roasting is the process of heating the coffee beans uniformly, first to remove the moisture (about 12%), then to cause pyrolysis of the sugar in the bean cells.

The sugars break down to caramel, water, carbon dioxide and many aldehydes and ketones which characterize the aroma and taste of fresh coffee. Pyrolysis is accompanied by (exothermic) heat liberation at over 400°F, and the roasting process is carried out until bean temperatures are taken to various levels or degrees of roast. For example, at 440°F we have light cinnamon color roast, and an acid tasting beverage. At 450°F end bean temperature, we have about 15 wt % loss and an American light roast. At 460°F we have perhaps 16.5 wt% loss and a European roast, and at 475°F we have an Italian roast with 20 wt% loss.

The roast weight loss is related to bean color and beverage taste, and often is related to the mode of brew preparation and cultural taste.

The dark roasts give less aroma; ^{burnt} ~~Some~~ Italian roasts have a fishy-amine odor.

Different coffee beans react differently to the various end temperatures cited. And various green beans have preferred levels of roast for best flavor development. In the USA too many firms roast their beans too lightly, because that gives less weight loss (greater yield and profit). Often roast level is determined by the coffee buyer-taster, who is used to evaluating green coffee beans at light roasts. The end result of such light roasts can be a very acid astringent harsh tasting beverage, that does not have optimum flavor development. It is a "wasted coffee" sold to the public.

If you see roasted beans that are mottled in brown color, there can be several reasons for this, none of which are desirable nor necessary.

- 1) Low grade non-uniform green coffee beans were used and blended.
- 2) Arabica and Robusta beans were mixed before roasting.
They do not roast uniformly together.
- 3) Different type, density Arabica beans are mixed before roasting.
- 4) Light and dark roast beans have been intentionally mixed.

Few people realize that the manner of roasting has a great deal of influence on the taste of the final roasted beans. For example, rotary steel cylinder roasters, which are traditional in the trade, e.g. Probat in Europe, due to their high operating temperatures over 800°F, cause scorching of the beans, oil release that can coat all the beans, and smoke from burning chaff that fumigates the beans giving them a harsh biting and (in dark roast) a burnt taste which is "dirty". The use of (Mellita) filter papers, for example helps remove some of this biting taste. It is far better not to scorch or burn the beans and not lay a tar coat on the bean.

NOTE that the coffee roasting industry has no international standards on degrees of roast, except verbal, which is very inaccurate. It is only since the widespread introduction and use of (Sivetz patented) fluid bed roasters, that those users have an absolute and accurate measurement of end bean temperatures, which are directly related to degree of taste development, color and weight % loss. This internationally applied in-production reference standard, is the only one that exists since the 1980's, and its growth is directly associated with the increased use of fluid bed roasters manufactured by Sivetz in the USA and Neuhaus Neotec in Germany. All other roasting machines have no such standard.

SOLELY AIR CONVECTION ROASTERS- SIVETZ FLUID BED ROASTERS

In order to avoid this scorching and non-uniform roasting of coffee beans Mike Sivetz, developed in 1975 a fluid bed "once-thru-air" coffee bean roasting machine that produces a clean "tar-free" non-biting smooth tasting beverage.

Simoultaneously, roasting time was reduced from the traditional 15 minutes to less than 6 minutes, all the while uniformly roasting each bean throughout.

In this same time frame, other roasting equipment manufacturers evolved roasting machines to roast faster (like 5 minutes), primarily to develop more acidity and less blandness in the Robusta coffees. However, these efforts usually resulted in higher roast chamber temperatures, and even more scorching of the beans, all the while not roasting the beans to the center. This gave a "BURNT-GREEN" taste to the final product, which, of course, is not satisfactory.

The continued use of recycled smokey air continues to deposit tars (possibly carcinogenic), onto the surfaces of the beans.

Therefore, it is clear that the roasting machines used and the mode of heat application to the bean, and the smoke recycle features all have considerable bearing on the taste quality of the beans produced.

Further the Sivetz fluid bed roaster with thermal bean sensor is the only roaster that can measure true bean temperature, because the probe is in a stationary box containing the fluid bed of beans, which accuracy cannot be directly achieved by rotary cylinder machines, due to the pure mechanical difficulty of probing a ^{moving} mass.

The Sivetz roasters have been very successfully used in the retail Gourmet trade shops and a number of commercial institutional roasting operations where clean smooth "non-bitter" tasting coffees are freshly roasted on premises.

The accompanying illustrations show the principles used on the Sivetz and the other cylindrical (hotter, smokier) roasters.

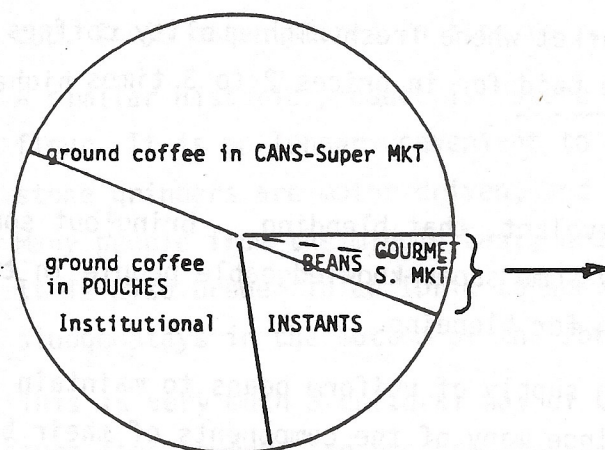
The simplicity of operating the Sivetz roasters is due to its sensing bean probe, box construction with only one moving part, cleanliness in use and with little maintenance. These features allow people who have never roasted before to successfully roast accurately and reproducibly, and to have freshly roasted coffee beans daily.

Sivetz Coffee Enterprises Inc. also furnishes AFTER-BURNERS for destroying the effluent smoke with a simple in-line gas burner (the same size as the roaster), whereas other systems use more expensive platinum catalytic media.

PROFILES OF

QUANTITY & QUALITY of U.S. COFFEE

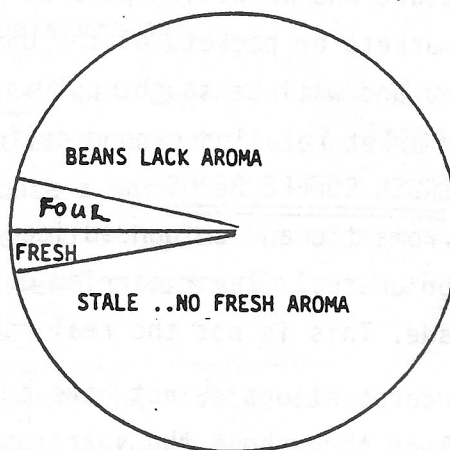
SALES Modes



COFFEE SALES MODES: BEANS, GROUNDS & INSTANTS
FRACTION OF MARKET

CANS	8,000,000	44%
POUCHES	6,000,000	33%
INSTANT	3,000,000	16%
Roast BEANS	1,000,000	7%
TOTAL	18,000,000	100%

Roast Bean FRESHNESS



FRESHNESS LEVELS
ROAST COFFEE BEAN MARKET

ROASTER FRESH, less than 2 days	
out of roaster	5%
BEANS LACK AROMA.. week old	10%
STALE, more than week old. at least	80%
VERY STALE, unacceptable at least	5%
TOTAL	100 %

HISTORICALLY roast coffee sold has always been stale, and to this very day we have prominent roasters both in the USA & Europe claiming that roasted coffee beans are acceptable in flavor for at least a month.

Other roasters for the institutional trade claim that pouched ground roast coffee can be kept "FRESH" for many months in evacuated and/or gas relief valve bags.

The canners of roast & ground coffee assume that their products are protected by vacuum.

ALL THESE CLAIMS ARE FALSE.

The only genuinely fresh flavored aromatic coffee is that which comes from the roasting machine, followed closely by roast beans that have been stored at 0°F or lower temperatures.

It takes an infinitesimal amount of oxygen to oxidize the aromatic portion of a few hundred parts per million aldehyde aromatics completely in a can in a few weeks, long before the coffee enters the marketing trade.

Chemical reactions occur between roasted coffee components even without oxygen.

Aromatic constituents are continually leaving the roast coffee irreversibly.

Roasters accelerate staling by adding water to the roasted beans, and degassing (holding for hours) before packaging.

Over the past 25 years, the coffee roasting trade, especially exemplified by the majors, like General Foods and P&G, have systematically and progressively increased their blend content to make ROBUSTAS and/or lower grades of milds, which actions have also reduced aroma and flavor content of the canned R&G coffees.

This deterioration in market quality has created a so-called GOURMET market for better quality and fresher roasted beans. This market falls into three basic segments:

1. BEANS ROASTED FOR SUPERMARKETS
2. BEANS ROASTED FOR "Gourmet" shops.
3. BEANS ROASTED in GOURMET SHOPS.

Of the 1,000,000 bags (60 Kg) green coffee that enter this roast bean market about 2/3 are sold through shelves in super markets, bagged or in plastic cubicles. Most of these coffees are STALE, to very stale.

Of the 350,000 bags green coffee sold through GOURMET shops, about 3/4 comes from regional roasters like WHITE in L.I.C. New York, Colony in Norfolk, Va., United in San Francisco, Van Cortland & HENA in N.J. and various others that are regional roasters or small roasters to the GOURMET trade.

This leaves about 1/4 or about 90,000 bags per year being roasted ON PREMISES of GOURMET COFFEE RETAILERS.

There are in 1986 >100 gas fired SIVETZ roasters in use. If each roasts 6 bags coffee per day, or 1,000 bags/year, that is, 160,000 bags/year. The balance from other makes.

CONSUMING COUNTRY-Roasters, packagers & distributors (FRESHNESS)

In the USA, the coffee market shares are controlled by a handful of corporations, that have established a canned, pouched or bagged mode of packaging & distribution. None of these modes of packaging preserve freshly roasted coffee aroma and flavor. However, since the public is a captive audience, ignorant and tolerant, these modes of manufacture and marketing persist for the most part in the USA, but ^{not} necessarily in other markets or pockets of the USA market where fresh high quality coffees are appreciated and will be sought out and be paid for in prices 2 to 3 times higher than supermarket retailed canned coffees.

BLENDING GREEN COFFEE BEANS

There is a romantic and unfounded idea prevalent, that blending bring^s out some mystical or unusual flavor carried out by some super knowledgeable people in the coffee trade. This is not the real reason for blending.

The large corporations do not have enough supply of uniform beans to maintain a uniform blend throughout the year, and since many of the components of their blends are lower grade beans, they are faced with uniformizing this "rag-tag" supply. By using a dozen basic sources, and blending them together, in a controlled way, some semblance of uniformity is achieved.

However, with the wide spread use of Robusta beans, which roast differently from Arabica beans, a system of separate roasting often develops requiring some blending of green beans before roasting, and some blending of roasted beans to achieve a diminution of the foul Robusta tastes.

Similarly, separate grinding of Arabicas (finely) and Robustas (coarsely) is also done. Finally, degassing and de-aromatizing the freshly roasted coffee beans is almost universally done so that the carbon dioxide released from the R&G coffee is so diminished that it does not cause pressuring of the thin walled coffee cans, vacuum brick bags and plastic sealed pouches.

The end result is a de-aromatized partly stale, "burnt-rubbery" tasting cup of coffee that begs for amelioration with cream or milk.

The main reason for blending is to create a low priced product so the cheaper less savory Robusta and less flavorful Brazils form the base major portion of the mix. In Scandinavia, where there have been decades of use of Brazilian coffees, they use Brazils as part of a habit in use created by barter treaties in the 1930's.

In the gourmet trade where only Arabicas are used of fresh quality, blending can and is used to change the taste profile of light aromatic Centrals and Colombians with heavier tasting Sumatra coffees.

More realistically, original varieties from limited areas of Sumatra, Kona, Jamaica, India, Celebes, Tapachula, Antigua, etc. are appreciated for their own unique tastes.

UNDERSTANDING WHY POOR QUALITY PREVAILS IN MASS MARKETING PACKAGED COFFEES

BY M. SIVETZ

It needs to be explained for coffee consumers, and those new retailers and wholesalers who are now entering the so called "gourmet" market, just how did the USA coffee market get to where it is today.

Without such understanding, one cannot maneuver into nor attain the necessary goals required for a sound business or for genuinely fresh high quality roasted coffees and beverages.

Everything depends on producing and delivering freshly roasted, top quality aromatic coffees. in the gourmet end, but not in the corporate end.

HISTORY

The U.S. coffee industry is concentrated in a hand full of corporations: General Foods-Kraft, Folger (P&G), Nestle, Chock Full O'Nuts, S&W, etc. who represent over 80% of all coffees roasted.

These corporations were founded and exist on the premise of mass manufacture, with buying of the coffee commodity in large amounts, with massive green bean storage and handling facilities, and especially huge fast roasting, grinding and packaging machines, accompanied by a grid of distribution depots across the country, servicing another grid of supermarket chains, and the whole program lavishly funded with extravagant advertising.

Today, these are national & international giants, and their callous methods are totally oriented to delivering what they want you to believe is a stable food beverage product, at the lowest price to your neighborhood grocery.

Canned coffee was not a significant commercial product until after WW II. And although its quality in the 1950's wasn't so bad, it was not as they claimed "fresh". The major roasters and their can company suppliers, would like you to believe their coffees were fresh, but that is untrue.

So we have to define "roaster freshness." We have been pummeled with "fresh ground" coffee, and "fresh" brewed" coffee, but neither of these vague and distorted names really tells the truth.

And their beautiful advertisements belie the foul taste of many of their coffee products today.

And then the sin of instant coffees set in after WW II, delivering a "coffee-like" product that was convenient, and with milk or cream even acceptable, but a far cry from truly fresh brewed good coffee.

Since 1/3 of the coffee drinkers use instant, and that is about 55% of the cups consumed, one can safely say that the consumers were not very discriminating in their tastes nor their standards.

As a retail gourmet shop owner and operator, I can categorically state, that we find most new devotees to prime beans, not very knowledgeable.

Of course, GF, Folger, Nestle, etc. never did spend any money to speak of on educating its "loyal" customers.

The vacuum canning of freshly roasted coffee beans was pioneered in 1906 by Hills Bros. in San Francisco for the Alaskan gold miners, so as to deliver a "better" tasting R&G coffee than what was arriving in paper bags. IT was better, but it was not in any sense of reality akin to "freshly roasted".

However, the seller, would like to call it FRESH, and the buyer being uneducated and in a deprived condition, was a captive user, as many are today.

BASIC FRESHNESS FACTS

Without getting into too many details, let me define what freshly roasted flavor is, and how long a shelf life it has.

The complex mixtures of say over 200 chemical components constituting the aroma of coffee, and varying with type bean, chemistry of bean, conditions of roasting and degrees of roasting, represents about 400(ppm)parts per million of the roasted bean or 1 lb of very volatile organic aldehydes & traces of esters, sulfides, etc. in one ton of roasted beans.

This coffee essence, or sometimes called oil, can only be trapped in a sophisticated dry ice (-75°C) and liquid nitrogen labyrinth, and will evaporate rapidly at room temperature.

This is the greenish clear essence that most everyone finds wonderfully delightful to smell, and if possible to taste.

All these components have come from the thermal decomposition of bean sugars at about 420°F, and are for the most part dissolved in the coffee oil (which is 20 wt% of the roasted bean).

This delicious aroma slowly diffuses out of the oily cell structure and into the air at a rate such that half is gone in 24 hours, 2/3 is gone in 48 hours and over 90% is gone by 72 hours at room temperature. Simultaneously, about 1.5 wt % of the bean is volatilized as gaseous carbon dioxide. That is about two liters of CO₂ gas per liter of beans.

What most people want is mostly gone in 3 days.

As the CO₂ blanket disappears, oxygen from the air enters and reacts with aromatic components.

By 7 days, the coffee taste is not only without significant aroma, but starts to be noticeably less palatable. Further, the aromatics and the non-aromatic products react with each other, further altering resulting tastes and aromas.

TIME IS EVERYTHING

Vacuum packaging does not preserve the aromas. Indeed, after the commercial roaster has wet and ground the beans, most all of the aromatics are gone before the grounds are packaged.

The only way known at the consumer level to get coffee beans with that delicious fresh aroma, is to go the roasting shop. But ALAS, until recent years there have been very few local retail shops. So the consumer is in a captive market, and has only the canned coffee.

Further, the coffee roasting giant corporations have never addressed themselves to solving this dilemma, so they ignore it; and continue to produce every day tons and tons of roasted coffees that are aromaless, stale and in many cases unpalatable. These same corporations have further drastically downgraded the contents of their canned coffees, by adding 10% water, using bad tasting Robusta beans in their blends, and using more defective low grade Arabicas. In fact GF made a study to find out just how bad their coffee had to be, before it would reduce sales. They have done nothing to bring the freshly roasted beans months, yeh weeks closer to the consumer, nor have they adopted sound handling techniques that can preserve the "fresh" properties of the bean until the user can get them.

The mass production methods of coffee processing use large scale buying of green coffee beans, massive storage and transport into and out of silos, air-veying beans, large capacity continuous (often) roasting machines, high throughput grinders and high speed packaging of the ground coffee into cans, bags or pouches.

Even though much research and development has been done and monies spent in the last 30 years, and since 1900, today's canned coffee is not much different from 75 years ago. In some cases like the vacuum brick, the end product is worse inspite of all the industrial and analytical advances made during that time.

The reason better quality coffee is not arriving into the consumer's hands, is that the coffee industry has focused its efforts more on short term profits and holding market share, than on making available genuinely fresh and good tasting R&G coffees. The inertia of the corporate mass processing defies leaving lower prices for quality.

THE EVIDENCE IS AS FOLLOWS:

- 1) It is very difficult to buy good quality freshly roasted coffee in the market.
- 2) The established coffee firms refuse to see that they cannot capture the fresh coffee aroma and flavor, and place it into a can. They do nothing good for the consumer to improve this quality deficiency, but plod along maintaining "status-quo".
- 3) In the 1930's and even into the early 1950's, the consumer got a WHOOSH of coffee aromatized air from a slightly pressurized can. Today in 1989, we have degassed, dearomatized, watered, Robusta coffees in thinner walled cans or worst yet bricks. THE WHOOSH is gone. Forever?
- 4) The consumer is not getting the fresh coffee with aroma.
- 5) Many owners and executives in the major coffee firms have actually come to believe that they are selling "fresh" coffee in their style of operations, and this false belief stops them from making any improvements.
- 6) Many places in the world, consumers will not accept American style coffee, because they know it is made up of inferior blends, watered and has bad tasting Robusta.

In many parts of Europe, namely Italy, and in Latin American, namely Mexico consumers still go to their local roaster and buy only freshly roasted coffee beans.

There is no massive intrusion into these markets with aromaless corporate products.

It is this same reason, that west coast consumers and pockets of consumers across the USA, have given their dollars to the local coffee bean roaster, for satisfaction

- 7) In the USA since about 1980, there has been a wide spread use of gas relief bags which are claimed to keep roasted coffee beans fresh for months.

This is untrue. Coffee aroma still disappears within 3 days at room temperature. The bags have enough residual oxygen to react with coffee aromas even in good bags. If you buy or just smell the gas leaving these bags on the retail shelf. they reveal that the coffee therein is stale. There are a few weeks, perhaps a month of improved taste value from such bags.

The manufacturers of these gas relief bags have never produced an iota of proof that this concept gives any long term protection to the coffee much less "freshness"

- 8) The vacuum brick package, which has been around for over 30 years, developed in Germany, is a package that assures you that the aroma and gas is gone from the R&G coffee before it ever was packaged. That is why it was not an acceptable package

Packaging & Freshness

PACKAGING ROAST COFFEE BEANS & GROUNDS

"Just-roasted" coffee beans may have twice their volume of carbon dioxide dissolved in the coffee bean oil, and this gas is released rapidly at first and then more slowly over a 3 day period (72 hours) at room temperature 70°F or 20°C.

With the CO₂ gas goes the aromatics and flavor components characterizing freshly roasted coffee and its associated delightful aroma.

About 20 years ago in Europe Goglio in Italy devised a rubber diaphragm valve so that freshly roasted coffee beans could be placed directly into an air tight bag and sealed. The valve would relieve "built-up" gas pressure, purge residual oxygen and thus give a few days or weeks "life" to the coffee protecting it from the oxygen of the air. However, the valve does nothing to retaining the aroma within the roast beans. This type packaging has been adapted since the early 1980's in the USA primarily by the roasters selling to "gourmet retail shops" about the country, as a means of retarding oxidation of the roasted beans, after roasting, during "in-plant" storage until shipped, during shipping, and then until the bag of beans is opened by the retailer to place in his plastic bin. REMEMBER the aroma has not been saved.

The only way to preserve the fresh roast aromas in the coffee bean is to place the "just-roasted-beans" into a sealed container in the freezer, and then that preservation time may exceed 4 weeks. No one has projected or attempted to sell frozen roasted coffee beans in a sealed container, but that is certainly a marketing possibility.

Once one grinds the roasted beans, the carbon dioxide gas leaves within the hour, as does the top aromas and flavor components.

Mass production involving tons per hour of roasting, grinding and packaging as done today does not retain any significant part of these volatile unstable coffee aromas.

What mass production does is minimize oxygen exposure after most all the CO₂ gas and aromas have left. This is most of today's quality level of coffee, a sharp reduction from what exists at the roasting machine.

The roasters put out claims about "freshness", but none explain the facts described above. Canned, bagged and vacuum sealed bagged R&G coffee is universally 2nd class coffee.

And all the advertising words and pictures in the world will not make it first class. Just like HUMPTY DUMPTY when he fell off the wall, nothing could put him back together again. And nothing can put back the aromas that have volatilized from the roasted bean or ground coffee, once they have left.

As for instant powder coffees, they have virtually no natural coffee aroma, except for the coffee oils that have been sprayed back onto them, to perfume the first flush of aroma from a just opened jar. There is no significant coffee aroma thereafter.

COFFEE PACKAGING & Freshness

HISTORY Pre- 1900, a rolled newspaper cone, or an ordinary paper bag were the common packages for green or roast coffee beans. Before 1900 green coffee beans were still being roasted at home. Then a highly calendered paper, called glassine, was introduced as a paper bag liner. Glassine paper was resistant to oil, hence contained the oil liberated from the roast coffee beans. In the first decade after 1900, the evacuated tin coated steel can first came into use, for the preservation of flavor and the convenience in use of ground roast coffee. This canning was especially developed by Hills Bros. of San Francisco for the Alaska "gold-rush". The original cans (truncated to save space in stacked shipment) were in 1924 converted to the straight cylinder evacuated can with key opener. This key can was in use forty years in that form, until 1963. The evacuated can of R&G coffee did not gain public acceptance quickly. This was because of the can's tradition and higher cost, especially during the depressed business years of the 1930's. After World War II, the growth in use of the evacuated can was rapid. Now the can represents 80% of all retail coffee sales in the U. S. A. In the interim, bag quality, for whole or ground roast beans, improved considerably with the introduction of polyethylene liners, aluminum foil liners, rubber compositioned (Pliofilm) liners and cellulose acetate (Avisco) type liners. However, these bags were always permeable to air. Stale tasting coffee was prevalent.

The ordinary paper or even polyethylene lined bag did not protect the R&G coffee from oxygen penetration. The ordinary paper bag let moisture through. It was not until the early 1960's that oxygen impermeable laminates of Mylar, Nylon, foil, polypropylene, and polyethylene or Surlyn came into commercial use. These laminated pouches of R&G coffee (packed with inert gas) partly displaced the various non-gas packed bags that were in use. The sealed/gassed pouches were cheaper than cans and were less bulky before and after use. The cited laminated pouches were far superior in their protection of coffee freshness relative to glassine or polyethylene lined bags. However, since the carbon dioxide gas slowly released from coarse U.S. grinds ballooned pouches, DEGASSING of R&G before pouching pre STALED the coffee. The magnitude of this prestaling was and still is in 1977 very serious, and suprisingly enough packers like General Foods and Continental continued to claim FRESHNESS for 6 months in these packs. Under strict laboratory and even production controls, there is truth to these claims. However, in common practice, the resulting R&G portion packed pouch packs were lacking aroma and were in cases outright STALE.

Both pouches and cans depend on keeping oxygen out of the container in order to preserve coffee FRESHNESS. If evacuation or gas (inert) flushing only removes 90% of the air, then 2 % oxygen remains in the package at the moment it is sealed. The void space between the granules of R&G in a one pound can is about 300 ml. Hence 50 ml air or 10 ml oxygen remain in the sealed can or pouch, which is common in commercial practice. In addition, there has already been aroma loss from the R&G coffee in the time lapse between grinding and packaging, which is often quite high. Also there is oxygen adsorbed on the R&G coffee granules before sealing. Eleven ml oxygen gas is 0.5 milli-equivalents that can and does react with 0.5 milli-equivalents of reactable aldehydes or coffee aromatics. If the pound of R&G coffee had 100 ppm acetaldehyde, a major aroma constituent, and typical homologous aldehyde, that would be 45 mg acetaldehyde or one milliequivalent of reactable " " , exactly enough to react with 0.5 meq O₂. In other words, there is stoichiometrically the equivalent amount of oxygen to seriously deplete the aldehyde content of the R&G coffee. Because the oxygen content is low in the can or pouch, the rate of oxidation is reduced, meaning that the older or longer time the can is not used, the greater will be the loss in aroma and staling. This is without the additional consideration of the reactivity of the aldehydes among themselves and with other reactive constituents in the coffee like phenolics.

ALTOGETHER the PROMISE of R&G Coffee FRESHNESS in the POUCH or CAN is very LIMITED to nil. It is important to note that in Europe, many firms pack finer ground darker roast R&G coffee within 1/2 hour or grinding and within a few hours of roasting, directly into gas flushed pouches without ballooning the pouch and with a higher level of flavor retention and shelf life.

The accompanying charts showing the types of packages for R&G coffee in use in the USA, are practical and real testimony to the FRESHNESS of R&G coffee entering the CANS & POUCHES, deteriorating in the cans & pouches, and deteriorating after the 3 and 2 lb cans are opened. If 29"Hg vacuum is used in can or bag packs, and in addition if inert gas purge accompanies it, better storage life is assured; but commercially hardly any roaster firm does this. In fact the employees and operators of roasting firms, especially the larger corporations, have come to believe that they are doing a very good job. They convey their "feelings" as salesmen to the buyers, who often have no basis to judge from their limited experience.

➤ Everyone is lulled into complacency and inaction and lack of vision to improve the quality of freshness.

Compounding this matter is the now broad use of Robusta coffees which poor flavor over rides any motivation for the roaster to improve or maintain quality operations in packaging. Only when conditions get so bad that the resulting coffees are undrinkable is some attention paid to these packaging details.

In a broad U.S. survey for a major U.S. hotel chain, last year some totally stale H&R coffees were found. Investigation showed that the roasters involved believed their packs were fresh for 6 months, and had long distribution times like several months and refused to CODE DATE the packs. One result has been that firms that had started to gas pack pouches, stopped, because, they found that faster distribution was better even if it took two weeks which in many cases was common from roaster/grinder to retailer, if not better than average. Unfortunately, the OCS and H&R operators are helpless to deal with large roaster suppliers, even when they know that their coffees are stale, except to take the drastic step of roasting beans themselves. A restauranteur unwilling to buy his own brewing equipment, and loans it from the roaster, is less likely to want to invest in a small coffee bean roaster for himself, even if he can totally upgrade his coffee system.



As a retailer that roasts, we have seen the public continually come into our shop and presume that every coffee bean from every origin will taste differently and smell differently. That is a serious misconception.

Although certain "marks" or names of original coffees may enjoy a good reputation for taste quality from past years, times and conditions change. Further, there is a whole range of qualities that can come from Mexico, Guatemala, Indonesia, Colombia, etc. so specifying national source can only be a general request.

From a professional tasting view, a high grown Central American washed coffee bean will not taste much different from a Colombian bean. A Kenya bean has a distinctive taste, but it can be easily confused with a high grown Central American bean.

These facts actually lump a great many of the world coffees as to similar taste.

What becomes more important is how fresh is the roasted coffee bean?

Within any one country, there are several classifications for Arabica coffees grown. Altitude above sea level is an important quality factor because cherries collected from over 5,000', are noticeably better tasting than those from 3,000' and these are better tasting than those grown at 1800'.

If the classification of the picked coffees has not been thorough, it can result in a lot of coffee that must be graded lower no matter what altitude it was grown at.

If benefaction methods have been faulty, that can downgrade the coffee & its price. Ultimately, the buyer must sample the coffee and taste it to make a sound judgement. Incidentally that is one important difference between a retailer that roasts on premises and one who does not. The retailer that roasts has to buy green coffee beans and consequently he has intimate knowledge of the taste value of his raw material; while the retailer that buys his roasted beans has no such knowledge beforehand, and sometimes very little after he receives the stale roasted beans.

To be sure there are some distinctive coffee tastes, by origin, but they are few. Sumatra & Celebes coffees from Indonesia are characterized by a desirable heavy flavor, missing from Central American and Colombian milds. They are basically stronger tasting coffees but lack the aroma of Centrals. Therefore blending Centrals and Sumatras, makes for a nice tasting blend. These two coffees are readily distinguishable in taste. Interestingly enough, Celebes, Kona & Jamaica coffees sold at much higher prices are at their best very similar, and at their worst not even as good as Sumatras. The public's image of what is to be demanded has driven up the prices on these beans because of their limited supply. The Japanese have especially created an aura and demand for expensive coffees for the egoists. Brazilian coffees tend to be harsh, lack aroma and are inferior to other mild coffees.

One needs to look at the quality of coffees being sold and what can be done to increase a company's market share of sales.

The quality of canned & bagged R&G coffees offered for sale in the USA is so poor, that the advertising agency simply has to "blue-sky" enthusiasm for unsatisfying products. The agency simply has to present some TV commercial with handsome men and pretty girls, using that particular brand of coffee, or pay dearly for a top movie or TV star to prostitute himself to say that that coffee is God's gift to us.

What is disconcerting is that the TV and newspaper/magazine ads make unfounded claims that they are putting GOURMET QUALITY coffee in their cans, or that "Yuban is a Gourmet coffee in a can". Nothing could be so far off base.

And when Nestle says they use GOURMET COFFEE in Taster's Choice freeze dried instant coffee, that is even more unbelievable. But they make the image by showing freshly roasted beans leaving a small 25 lb retail shop roaster, and stating that that quality and freshness is in their instant coffee.

I'm sure as mis and un-informed as the public may be, they don't "buy" that line.

The real backbone of promotions and selling for mediocre to poor coffees in a field of mediocre, stale and poor tasting coffees is to offer supermarket discounts and to offer coupons, gifts, and prizes. That is real and the buyer can understand that.

The General Foods claims that placing freshly roasted and ground coffee in cans (1986) with FLAVORLOCK packets of chemicals to absorb carbon dioxide and oxygen, belies the aromaless and poor flavor that is in the contents, namely Master Blend, a R&G canned or vacuum bricked coffee high in Robusta beans and with over 5% water, sometimes 7%.

The word PREMIUM on a can has been abused, because the contents can contain significant amounts of Robusta (burnt rubber) tasting beans.

It is revolting that G.F. & P&G can offer vacuum packed degassed R&G coffee in bag brick form, and claim a new & wonderful packaging triumph. On the contrary, the vacuum-ized brick package has a debased R&G coffee in so far as freshness is concerned, and lacks the integrity of the can, because many slack bricks can be found on store shelves.

It is also doubtful that the HIGH YIELD claims of using 13 oz instead of 16 oz can be substantiated scientifically. But now we have a 13 oz pound, and black is white.

The 13 oz concept is attractive because, it tells the buyer he is getting something more than what he might otherwise get. Suckers are born every day. The 13 oz pack does allow a lower unit price which in the end, is the real inducement. The buyer still has not adapted himself to differentiating 13 oz from 16 oz, so he is tricked at the moment he buys impulsively. P&G even offers a 11.5 ounce can of decaf R&G.

The ICO in London collects US\$.25 per bag coffee for use in world wide consumer country promotions. For 60,000,000 bags per year that is US\$ 15,000,000 per year. The administrators of the ICO have some difficulty applying these monies because they cannot use discriminating advertising against the poor qualities of Brazil or Robusta coffees. The ICO's director, has managed to spend this money in what I consider very strange ways. For example a \$1 million or two were used for a generic advertising program in conjunction with the NCA in the USA. This was a totally oblique and probably near useless effort and expenditure. Later the ICO advanced millions of dollars to help promote coffee drinking in the NCSA or office coffee field, and that money was much appreciated by that association.

I find it difficult to understand how one could hope to promote drinking of the Robusta low grade coffees so widely used in the institutional trade!

Never-the-less more and more money has been given this group for this purpose. And since about 1981, some millions of dollars have been spent on the CDG. called the Coffee Development group in Wash. D.C. Their major thrusts have been to set up, under local auspices, espresso shops in Universities, and to offer architectural advise to those new college shops. Needless to say, this has had little impact except for those who benefit from the spread of these monies. The CDG has produced some innocuous pamphlets, maps, ^{posters} and misc. matter, and has repeatedly promised to produce a technical manual on coffee for everyone. This has not yet happened.

Some of these activities, reflect back to the 1960's and 1970's when the Pan-American Coffee Bureau in NYC, tried to train institutional users on the various types of brewers available in the USA, and came up with the absurd quality test of soluble solids content in brewed beverage being made equivalent to efficient extraction. This unfortunate philosophy has been extended into the very wide use of automatic drip brewers in the USA with exhaustive extraction, and the High Yield solubles claims of fast roaster and flaked coffees.

This international association of coffee growers, really is not monolithic in its products or its aspirations, and these promotion programs simply reflect some of those compromised decisions in the ICO promotions.

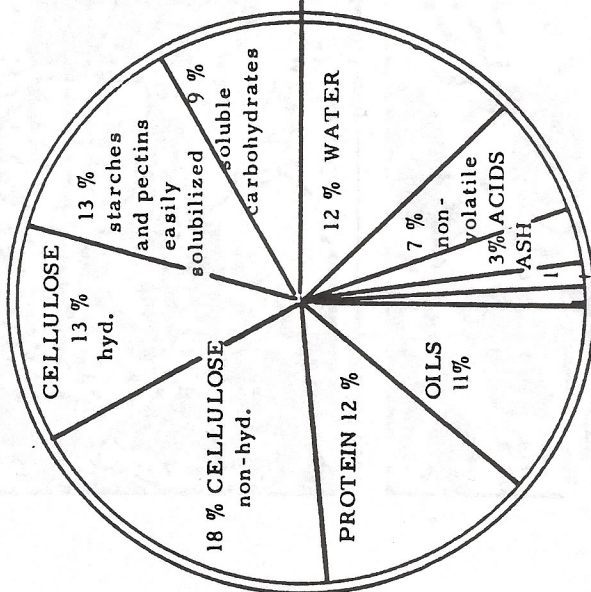
It is equally important to realize that the offering of fresher and better quality coffees via the gourmet shop routes, as varied as they are, has done more to increase consumer satisfaction and good coffee use, than anything the ICO, NCA, NCSA or Pan American Bureau ever did.

Chemical Composition of Coffee

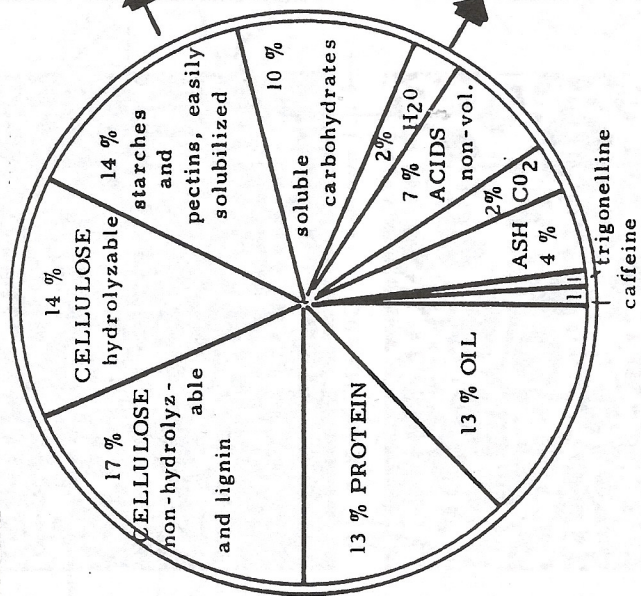
89

CHEMICAL COMPOSITION OF coffee

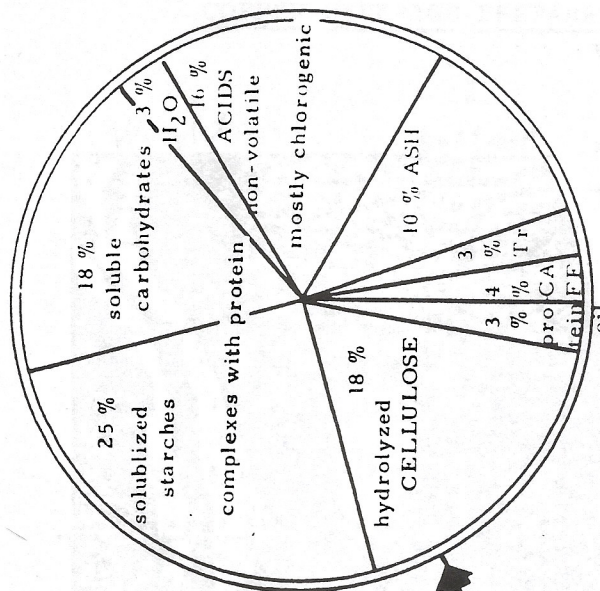
GREEN, ROAST and SOLUBLES (instant and brews)



GREEN BEANS

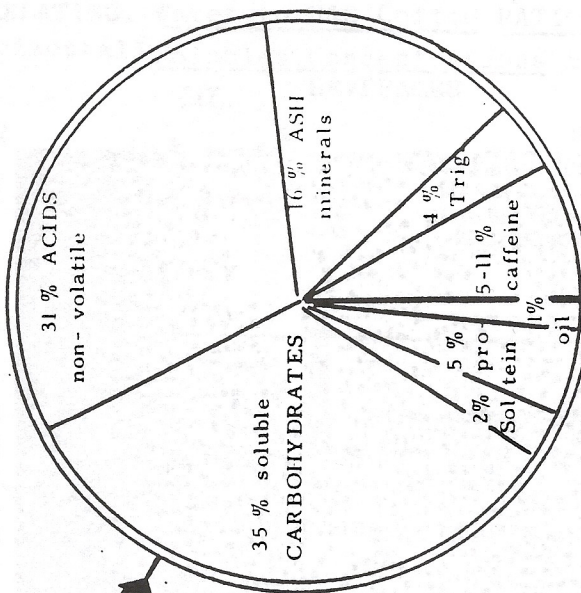


ROAST BEANS



INSTANT SOLUBLES

at 40% green bean or 47% roast bean yields with hydrolyzed carbohydrates



BREWED SOLUBLES

at 20% green bean or 23.5% roast bean yield without hydrolyzed carbohydrates

0.85 Kg

1.0 Kg

SIVETZ COFFEE CO.
349 S.W. 4th Street
Corvallis, OR 97333
(503) 753-9713

The green coffee bean has 1% caffeine in Arabicas, and 2 % caffeine in Robustas. It has about 7 wt% soluble organic acids, 3 % ash, 9% soluble carbohydrates, 13% easily solubilized starches and pectins, 13% hydrolyzable celluloses, and 18% not easily hydrolyzable celluloses. Also there are about 12% proteins and 11 % oils.

Green coffee beans when granulated and extracted with water give about 25 wt% water solubles. Roasted coffee beans give about the same. However, by pulverizing the green or roast beans, the solubles released rise to a bit over 30 wt %.

The protein in the roasted beans is denatured, made insoluble.

The organic acid is mostly chlorogenic, but there is some citric, malic, caffeic, tartaric, oxalic and pyruvic, ..all non volatile.

The sugar portion of the soluble carbohydrates, breaks down on roasting to give about 2 wt % carbon dioxide gas, several hundred parts per million aromatic aldehydes and ketones and esters, and 0.4 wt% acetic acid with 0.02 wt % proprionic, Butyric and valeric acids. The latter are all very aromatic and flavorful.

About half the chlorogenic acid decomposes during roasting to caffeic acid & quinic acid.

ACIDITY Normally brewed coffee beverage has a pH between 4.9 and 5.5 depending on the degree of roast; light roasts are acid, and dark roasts are less acid, for Arabicas. Robusta beans are in general less acid (pH 5.4 to 5.6), bland and do not taste good.

In the process of making beverage, the roasted coffee solubles are 1/3 soluble carbohydrates (incl. caramel), 1/3 non volatile acids as described, 1/6 minerals (ash) high in potassium, 5 to 10% caffeine, 4 % Trigonelline, a fraction of a per cent oils, and several percent solubilized colloidal proteins.

In the process of making instant coffee, which can yield twice as many solubles as atmospheric hot water brewing, the general chemical composition is the same as above, except it is cut in half due to an equal weight of celluloses being made soluble. Commercial instant coffee manufacturing, depending on the blend ratio of Robustas and Arabicas, can give 40 to 50 wt% solubles ~~of~~ instant coffee from every unit of green coffee beans. Obviously from this chemical composition, the instant coffee solubles are far from the same as brewed coffee solubles.

SPENT COFFEE GROUNDS will be about 80 wt% water, and their vegetable oil content rises to 16 % on brewed coffees and to 22 wt % (dry basis) from instant coffee manufacturing operations. When spent instant coffee mfg grounds are pressed, their water can be reduced to 50%, from which point they may be dried and may be a very useful fuel.

SIVETZ COFFEE ENTERPRISES, Inc.
COFFEE BEAN ROASTING MACHINES

Currently

CONSULTANT & MANUFACTURER & RETAIL SHOP owner
 ENGINEERING & CONSULTING
 PHONE (503) 753-9713

349 S.W. 4th STREET
 CORVALLIS, OREGON 97333 U.S.A.



AUTHOR of the 1st technical book on coffee COFFEE PROCESSING TECHNOLOGY 1963
 " 2nd & 3rd " " revised to COFFEE TECHNOLOGY 1979 and
 1993 Manufacturing fluid bed roasters for 18 years to date. 1974 Origin & Use

1980 DESIGN & CONSTRUCTION OF SOLUBLE COFFEE PLANT IN HERMOSILLO, SONORA MEXICO

1979 " " " large battery of instant coffee extractors CHILE

1986 SURVEY TRIP TO INDONESIA, esp. Sumatra/Singapore to evaluate gourmet coffees.

1982 Trip to INDIA to help Brook Bond improve instant coffee operations.

1983 Trips to Europe & Ecuador designing and evaluating instant coffee project.

1975 Hamburg, W.Germany presented paper at ASIC meeting on fluid bed roaster (patented).

1976 Gave technical assistance under agreement with Neotec, Jabez Burns licensee
 in Hamburg. on design and construction of Sivetz fluid bed roaster, 2'74.

Neuhaus-Neotec pays Sivetz royalties on his roaster patent, and they
 have sold dozens of units altogether to GF, Nestle and other major roasters.

1972/ 1985 Technical editor to WC&T and T&CTJ on coffee articles contributed.

1980 Bought a downtown Corvallis old church building and renovated it to contain
 a retail coffee shop, a 1/2 bag roasting operation, extraction operation, and
 machinery for a full line of electric, gas roasters with after burners.

1980-1986 Guest Lecturer at O.S.U. Food Tech. Dept. on coffee with demonstrations.

1969-70 PROJECT MANAGER Oregon Freeze dried Foods on coffee project.

1968 Project manager on design, purchase and engineering of spray driers to produce
 near anhydrous $MgCl_2$ for AMERICAN MAGNESIUM CO. Tulsa, OK.

1966-67 TECHNICAL DIRECTOR of the largest instant coffee plant in Brazil, Londrina
 PARANA, producing 10 million lbs instant coffee per year, training all personnel,
 producing operational manuals, and generally placing Cia. Cacique into the black.

1963-66 R&D Project Engineer with Kaiser Al & Chem. in San Leandro, CA.
 Pilot manufacture and design of facilities to make poly amines for poly Urethanes,
 and manufacture anhydrous $MgCl_2$. Design of fluid bed systems.

1961-62 CONSULTANT & author of COFFEE PROCESSING TECHNOLOGY.

1959-61 Technical Director for Cafes Solubles SA Managua, Nicaragua.
 Design, purchase, installation & operation of instant coffee plant.

1956-58 J.A.Folger Coffee Co. Houston, Tx Technical Director instant manufacture.

1954-56 General Foods, Hoboken, N.J. Project engineer on Maxwell House instant coffee
 manufacture and new process applications.

1949-53 Assoc. CHEM. ENGR Argonne Nat'l Lab heavy water demineralization and Nak
 coolant system designs.

1946-49 COCA COLA EXPORT CORP. New York City, Rio de Janeiro BRAZIL & HAWAII
 Field engineer and supervisor of bottling and syrup plants.

1943-44 GENERAL FOODS Corp. Hoboken, N.J. Sorghum starch recovery & caffeine recovery.

EDUCATION: 1939 B'klyn Tech. H.S., 1943 B'klyn Polytech, 1945 Northwestern Univ. Masters
 1946 MIT 1 semester graduate school Chem. Engr.

PUBLICATIONS: Two patents, 3 books, 3 booklets, and over 60 trade & professional articles.

BIBLIOGRAPHY

The coffee business aspects were until after World War II largely undocumented, except for small unrelated romantic articles in newspapers and magazines and two trade journals in the USA.

It was Wm. Ukers, editor of the Coffee & Tea Trade J. that first published his book ALL ABOUT COFFEE in 1922. It contained 800 pages (7" x10"), and covered History, Agriculture, Science, Commerce and cultures with many illustrations. This was a monumental piece of work, and was very well documented and profusely illustrated. A 2nd edition was published in 1935, and in the 1980's a reprint was published. This book freezes in time what was going on in the pre WW II period and its scope and depth have not been repeated since.

In 1935 a German book by H.E.Jacob was published by Viking Press, New York, titled THE EPIC OF A COMMODITY which explores most interesting aspects of world commerce in coffee, and is full of interesting and exciting historical happenings in coffee.

During World War II, the U.S. government asked numerous coffee companies to prepare instant coffee for the military forces all over the world. This resulted in many companies like General Foods, Nestle, Borden, Chase & Sanborn, G. Washington, and others to try their hand at it. Nestle had the greatest experience and made the most acceptable tasting product; the others did not. Nestle did not share "know-how".

Since the extraction and spray drying of coffee extracts is a very technical business requiring chemists and engineers, a great deal of scientific and engineering knowledge was developed; but much of it was not positive and little of it was published. After WW II, it became an important business decision as to whether, these same companies furnishing instant coffee to the U.S.Army could sell that bad tasting stuff to the public. Obviously there was a large "fall-out", and only a handful of food processors continued to manufacture instant coffee with progressive quality improvements. In the early 1950's General Foods forged ahead with a 100% pure instant coffee powder that was not dusty; and the demand for this acceptable product was an unprecedented expansion of production facilities in Hoboken as well as in Jacksonville, Fla.; Montreal, Canada, Houston, Texas, and San Leandro, Ca.. This resulted in a great influx of scientists into this industry, not only with G.F. but with C&S, Folger, and many private labels manufacturers.

However, there were no published guides or sources of information on the physical properties of coffee, not much on the chemical properties of coffee, and only occasional trade articles on other aspects of the coffee business. The entrenched owners relied on coffee bean buyers, who were highly paid, to choose blends, set degrees of roast, even select machinery, which they were unqualified to do. These green coffee buyers stonewalled the engineers and quality control technicians.

Bibliography

It was because of this stone walling, and outright hostility and ignorance that the engineers and other scientists had to learn all about the coffee business and tasting as well. The Uker's book did not answer the questions raised at that time. An engineer or chemist entering the coffee firm, virtually had no book or published material from which to educate himself, but was on the contrary deluged with rumors, false facts, and usually pure vacuum, all sprinkled with various levels of ignorance.

So after working in this atmosphere ten years, Mike Sivetz, authored the first organized professional technical book in this field, namely COFFEE PROCESSING TECHNOLOGY in 1963, and this became the prime reference, BIBLE to some, in the still fast growing coffee and especially instant coffee industry.

When the first edition copies ran out, Sivetz published his own book titled, COFFEE ORIGIN & USE in 1978 with updates each two years thereafter. Some of this material was then incorporated into the revised Avi Published book COFFEE TECHNOLOGY in 1979, which edition was sold out by 1986. This trio of technical books is the legacy of a coffee industry that ran before by the seat of its pants and grew to levels of incompetency here and there (Murphy's Law).

In 1962 A.E.Harrer had Leonard Hill of London publish his book MODERN COFFEE PRODUCTION which deals quite well with the agricultural aspects of coffee propagation & production. In 1969 R. Coste, head of the Inst. Francaise du Cafe e Cacao wrote in French the book "el Cafe" dealing with agricultural aspects of coffee growth especially oriented to the Ivory Coast. This book was published in Spanish in 1975.

In 1964 A. Rochac, Technical Manager, of the Bank for Inter American Development had his book, titled Diccionario de Cafe published in Spanish printed in Mexico by the Pan American Coffee Bureau in NYC. This is a very useful reference on standards.

The Germans have always had a deep interest in coffee properties and qualities and generally like good tasting coffees, although this quality has fallen since 1975 as the coffee market changed from many small "mom & pop" roasting shops to 4 or 5 major mass producers.

In 1963 Gordian-Max Rieck GmbH of Hamburg published a 171 page book titled, GREEN & ROASTED COFFEE TESTS supported by Bernard Rothfus, notorious green coffee importer. This book is highly illustrated in black & white photos showing beans from various world sources and with varying defects.

Rothfus, being a very successful business man has also had published COFFEA CURIOSA about 1970, which is not technical, but a highly illustrated colored artifact collection. In 1980 Rothfus had Gordian publish a 365 page book with many colored illustrations, titled COFFEE PRODUCTION, dealing with the agricultural aspects of coffee.

In 1986 Rothfus issued a companion book titled COFFEE CONSUMPTION describing the processes of roasting/packaging in the consuming countries (mostly Germany). 427 pages.

This consumption Rothfus book is rather full of German commercial machinery flyers, and does not critique the quality of the machinery nor the value of the packaging machinery's functions in presenting "fresh" acceptable tasting coffee. It dwells on Probat and Neotec (Burns licensee) roasters. The Neotec RFB fluid bed roaster, was licensed from Mike Sivetz (U.S.Pat. 3,964,175 in Feb. 1976,) first royalty payment was in Dec. 1986 based on ten industrial sized roasters.

However, the book has very many interesting illustrations collected therein, even if its text is rather shallow in treatment of the subject matter.

Both the Coffee Production & Consumption books are never-the-less useful references.

The technical papers collected each two years since 1963 in the biennial ASIC meetings sponsored by the IFCC in Paris, have a broad collection of reports on everything from agriculture, to chemistry, industry and physiology, and offer sometimes some very useful technical documentation. These international meetings allow a platform to meet other coffee scientists and to keep abreast of advances.

In 1983 C.F.Marshall had his book published by Woodhead Faulkner in Cambridge England, titled THE WORLD COFFEE TRADE. Marshall's expertise is largely in coffee commodity contracts, the influence of the ICO and related Terminal MKT functions, transport and handling. A useful reference to commercial aspects.

In 1985, M.N.Clifford & K.C. Wilson edited a 460 page book published by AVI of Westport, conn. titled COFFEE, BOTANY, BIOCHEMISTRY & PRODUCTION which updates and elaborates on the indicated subjectmatter.

In late 1985 R.J.Clarke & R. Macrae edited a 300 page book published by ELSEVIER TITLED: Vol. 1 CHEMISTRY of COFFEE with chapters on history, water & mineral contents, carbohydrates, nitrogen compounds, chlorogenic acids, lipids, volatile components, and carboxylic acids. The publisher indicates subsequent volumes 2 on Technology, 3 on Physiology, 4 on agronomy, 5 on related beverages & 6 on Commercial & Tech-Legal Aspects.

Another very important source of current coffee developments are the published abstracts of patents in all countries, and especially U.S. Patents.

Patents and all published trade and technical articles are also screened and abstracted in the FSTA (Food Science Technical Abstracts) monthly publication of the IFIS Int'l Food Information Service in England.

Finally there is a continual stream of popular paper backs written often by professional writers with little to no background in the coffee industry, and a few with little to limited experience in the coffee industry. Some of these booklets are of interesting nature, often with numerous errors, sometimes highly illustrated in with color prints. These booklets are not reviewed here.

Check List for Coffee Qualities

1. BOTANICAL VARIETY: ARABICA OR ROBUSTA (and sub class)
2. ALTITUDE OF GROWTH (above sea level)
3. GEOGRAPHICAL ORIGIN (world location and climate)
4. AGRICULTURAL CONDITIONS (incl. history, floods, droughts, diseases, etc.)
5. BENEFACTION CONDITIONS (reputation of mark, machinery & management)
6. COUNTRY STANDARDS (product and people)
7. PHYSICAL PROPERTIES & GRADE (bean color, size, texture, shape, uniformity, purity & defect level)
8. CHEMICAL COMPOSITION (chlorophyll, moisture, sugar, caffeine, mold, ferment)
9. Green Bean SENSORY PROPERTIES (color, odor & uniform appearance)
10. NORMAL ROASTING PROCESS (good bean swelling, much "popping" sounds, min chaff)
11. Roast beans SENSORY PROPERTIES (uniform color, development, aroma & taste)
12. Green bean sample is representative of (250 bag) lot
13. CURRENT CROP (wholesome clean appearance, w/o faded color during storage)
14. ACCEPTABLE (normal test results with out taints)
15. TIME SINCE ROASTED, and how stored or packaged?
16. TIME since grinding, and how stored or packaged?
17. BREWING METHOD & EQUIPMENT USED
18. TIME BETWEEN BREWING & SERVING, and how held?

For those who care about
FRESHEST AROMA
& BEST TASTE
SIVETZ COFFEE
 349 SW 4th St. (503)753-9713



CORVALLIS, OREGON 97333

