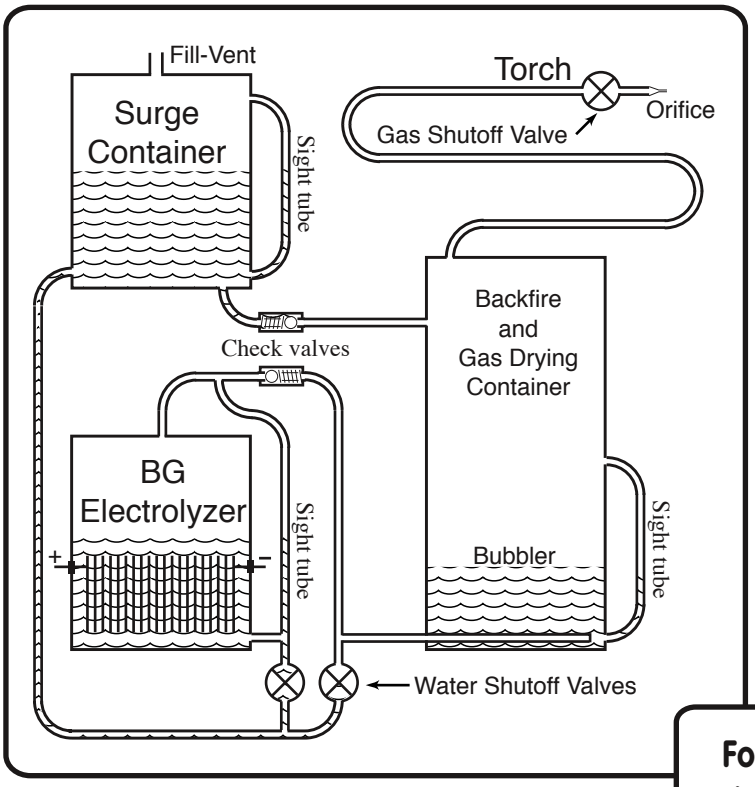
BROWN'S GAS

Book One



A beginner's guide to Brown's Gas

- brief history
- simple experiments
- an explanation of the unique properties of this uncanny gas

Follow Eagle-Research to discover dozens of diverse Brown's Gas applications (other texts and videos):

- neutralization of nuclear waste;
- creation of semi-precious stones;
- replace fossil fuel in vehicles . . .

Author of Water as Fuel & HyZor Technology

George Wiseman

READ THIS FIRST

5 things to know about this eBook

1. This eBook is best read using Adobe Acrobat Reader

2. This eBook is a direct electronic representation of the physical book, therefore, it is not optimized for viewing on a computer screen. You'll need to scroll up and down to read the columns. We kept it this way to allow reference, to exact locations in all versions, when answering questions or addressing corrections.

3. The eBook page numbers may not match the PDF file page numbers. In 'print' books, there are commonly a number of pages, at the front and back, that are not numbered or use Roman numerals.
PDF files typically start by numbering the front cover page 1.
All our references to pages in this eBook will assume the 'print' page numbering.

4. This eBook has full page links over most of it's pages. Clicking on a page will connect you to the Eagle-Research website (usually the Resources Section). Scroll using the sidebar.

5. This eBook was 'State of Art' when it was initially published. Today it is still excellent basic information. However, as always, our technologies improve, and information becomes obsolete, faster than we can print, publish and circulate updates.

Our solution - Eagle-Research Online Resource sections that contain:
Parts and services supplier information; application comments; options; updates; upgrades; support links; support documents; FAQ entries; wiki entries; blog entries; forum discussions; test results;, product installers; product manufacturers; post-publication technical corrections.

Since 1984 Eagle-Research has been committed to gathering energy information from diverse sources, experimenting with it , merging possibilities into actuals and distributing solutions that empower the individual.

The Eagle-Research Online Resources will help you start your project with the latest information ... then continue to upgrade your projects when new information becomes available.

Patent-free Technology
• Brown's Gas
• Fuel Savers
• Free Energy

www.eagle-research.com

This eBook is registered to:

Eagle-Research Contact Details:

Eagle-Research Online Resources:
To fully access the ER Online Resources, log into the ER eStore account that you used to buy the Resource Access privileges. The ER website will then automatically recognize you as an authorized user and will allow access the Customer-Only information.

Subscribe to the Eagle-Research eNews to occasionally be informed about what's happening with ER.
Follow < **Eagle_Research** > on Twitter for 'instant' tips, queries, notifications, updates, comments ...

eBook Distribution Privileges:
If you sell or distribute eBooks online and would like to include a copy of this eBook as a bonus to your product(s), contact Eagle-Research using the contact form on the website.

EAGLE-RESEARCH MISSION

Eagle-Research is an organization that develops and distributes practical energy solutions.

We define practical as simple, inexpensive, environmentally-considerate, easy to build, low maintenance and, applicable to small scale energy needs.

We gather information from diverse sources, perform comprehensive experiments using rigorous standards, then publish how-to books to share the results with other researchers and the general public.

We believe that writing books insures that these technologies will be secured public knowledge, and that our patent-free philosophy promotes increasingly better energy solutions.

Eagle-Research does not accept government grants. The money from the sale of our books and devices is used to finance on-going research.

EAGLE-RESEARCH ADVOCATES PATENT-FREE TECHNOLOGY

"I differ from most inventors in many ways. For one, I actually make my living and finance continued research by inventing. Two, I don't hold-back 'secrets' of my innovations. Three, I do not patent my work. It is distributed worldwide as public knowledge, so no one else can patent it either.

Actually, the patent office is very inefficient and people have gotten patents on my technology... usually to fraud investors. However, the patent is worthless. Patent law states public domain information is not patentable.

FINANCING OUR RESEARCH

As more work and research gets done, we will write further books in each of our lines of research. By writing a series of books in this manner, we can keep you updated on the latest information on energy saving research. Selling information is how we make money to continue our research. Therefore, you will not do yourself or your friends a favour if you copy this book to distribute to your friends. In doing so, you deprive us of funds to advance the research that will help us all.

For order inquiries, technical assistance, or contact information, go to:

www.eagle-research.com/contact

DISCLAIMER

This book is sold for research and/or experimental purposes only. Therefore the results, which will vary according to the user's knowledge, expertiseand application should be considered strictly experimental.
George Wiseman, his associates and/or distributors, assume no responsibility for damage or injury due to the reader's use or misuse of information or instructions presented herein.

Although care is taken to present accurate information: "If we knew what would happen, it wouldn't be an experiment." Therefore, the author will not retroactively inform or reimburse buyers if (when) there are corrections or updates to this book. Contact Eagle-Research for the latest developments.

If the conditions outlined in the proceeding paragraphs are not acceptable, the buyer will return the book immediately to the seller, for a full refund.

WORK IN PROGRESS

Eagle-Research is a research and development organization dedicated to finding the best possible energy solutions.

Because the nature of research and development is an evolving process, we are continually improving on the technologies we are working with.

Though we're proud of our commitment to constant and never-ending improvement, we do recognize there is an unfortunate side-effect: Our 'best' today will pale in comparison to our 'best' tomorrow.

At any given date, the Eagle-Research discoveries, which are distributed in the form of web information; books; videos or devices, are at varying stages of development.

Therefore, by the time our most up-to-date 'best' can be compiled, organized, produced & distributed, we've already improved upon the information. We're working as fast as we can.

STAGES OF DEVELOPMENT OF EAGLE-RESEARCH PROJECTS

1. Concept: I think I have an idea!
2. Research Assistant: compiled research to develop a working theory
3. Theory: explore research to develop proof of concept experiments
4. Proof of Concept: hands-on; try methods to make design of prototype possible
5. Initial Prototype Design: to begin experimental prototype
6. Practical spinoff: useful technology developed that is not the main line of research
7. Experimental Prototype: working experiments; proof of technology
8. How-To manual: comprehensive instructions
9. Kit: assembly of parts
10. Device: including operation manual

PRINTED IN CANADA

Brown's Gas, Book 1

Version Nov., 2009, March, 2002.

DISCLAIMER

This book is sold for research and/or experimental purposes only. Therefore the results, which will vary according to the user's knowledge and expertise, should be considered strictly experimental. George Wiseman, his associates and/or distributors, assume no responsibility for damage or injury due to the reader's use or misuse of information or instructions presented herein.

Although care is taken to present accurate information: "If we knew what would happen, it wouldn't be an experiment." Therefore, the author will not retroactively inform or reimburse buyers if (when) there are corrections or updates to this book. Contact Eagle-Research for the latest developments.

If the conditions outlined in the proceeding paragraphs are not acceptable, the buyer will return the book immediately to the seller, for a full refund.

This version of Brown's Gas, Book 1 edited by Alex Lange, 25484 Lake Wolford #196, Escondido, CA, 92027.

For order inquiries, technical assistance, or contact information, go to:

www.eagle-research.com/contact

TABLE OF CONTENTS

INTRODUCTION

I have written this book to further add to the published general knowledge of Brown's Gas (BG). I have found that there is a lot of misinformation floating around about Brown's Gas. I wish to try to present accurate information that will lead to safe and effective use of this technology. Until Yull Brown writes a comprehensive documentary, experimenters are at risk. I wish to reduce the risk, in my life and in the life of any person experimenting with hydrogen and oxygen.

This Book is the first of a series that will allow anyone to experiment with Brown's Gas. I feel it is important to duplicate Yull Brown's work because he holds much of his knowledge as secret as possible, and I feel the world needs this technology. Duplication will verify the technology while making public the knowledge that will make the technology safe to use.

I differ from most other inventors in several ways. For one thing, I actually make my living and I finance my continued research from inventing. Secondly, I make my innovations available directly to the general public. Third, I do not patent my work and everything you see or read of my work is made public knowledge, so no one else can patent it either.

Or rather, someone could attempt to get a patent and might even get one (the patent office is very inefficient that way) but if that patent owner tried to prevent my (or your) use to my information in court, the case would be thrown out because I can prove my information has been distributed worldwide and described in public disclosure documents. Patent law states that

information generally available to the public is 'public domain' and is not patentable.

My Brown's Gas generator and power supply designs are either previous public knowledge, expired patent information or sufficiently different from any patented designs (even Brown's) so you can build them (even sell them) without worry of stepping on someone's legal rights.

I really wanted to get away from caustic solution and the heavy transformer of most Brown's Gas generators. The goal of this line of experimentation is to come up with a set of plans for a Brown's Gas generator that can be built and operated safely by the average do-it-yourselfer. The idea is to allow people to experiment with Brown's Gas without the heavy duty cost of a commercial Brown's Gas generator.

Not to say that the commercial Brown's Gas machines are over-priced; I believe they are worth every penny to someone who can use them commercially. But for the private individual who simply wants to use Brown's Gas for small projects and experiments, I think the price of the commercial machines is excessive.

This Book describes the process of development of a simple, inexpensive, small Brown's Gas electrolyzer that can be used to demonstrate Brown's Gas effects.

I describe my mistakes as well as my successes and the thoughts that led to both. As an inventor, I know that failure is just as important as success. Both are learning experiences and vital to the eventual understanding of the process or device. You bought this book so you wouldn't have to repeat my mistakes.

WARNING by Yull Brown
"Attempts at applications made by unqualified people who do not know all of properties of the gas could be very dangerous and create extremely hazardous conditions leading to the possibility an explosion. Brown's Gas Generator/Water torch (as sold by Yull Brown) is completely safe when used as a source of heat for welding. Experimentation is not to be attempted with the gas separate from the generator."

Yull Brown is very concerned that experimentation with hydrogen and oxygen will cause explosions that will reflect badly on himself and/or the 'Brown's Gas'. He doesn't want a 'Hindenberg Syndrome' attached to him or his technology. In addition, he would like to receive a monetary benefit for his technology, in which he has invested a large portion of his life. It has come to this author's attention that Yull Brown is writing a book on hydrogen. This author would like to support that undertaking, because knowledge written down will outlive the author while making future use of the technology safer. This author acknowledges Yull Brown as the best expert on Brown's Gas.

*(**Update note:** Yull Brown died on May 22, 1998, in Auburn, Australia.)*

HISTORY OF HYDROGEN

Hydrogen gas was discovered by Swiss alchemist and physician Philippus Aureolus Paracelsus (1493?-1541) who is said to have observed the production of 'an air which bursts forth like the wind' when iron and sulfuric acid are brought together.

Henry Cavendish (1766-1781) studied the substance. He called it inflammable air and proved that when burned in air nothing but water was formed.

In 1783, Antoine Laurent Lavoisier named the gas hydrogen, derived from the Greek words for water and producer.

Also in 1783, Prof. Jacques Alexandre Cesar Charles raised a 13 foot balloon in Paris, which traveled 15 miles in 45 minutes, and was destroyed when it landed by terrified peasants attacking it with pitchforks.

In 1853 Michael Faraday, an English physicist, during his research separated oxygen and hydrogen from water, using electricity. He called the process 'electrolysis'.

Through the decades, lighter than air craft received sporadic attention Several technologies came together in the early 1900's to make airships practical. For example, light weight, high horsepower engines were developed to direct the airships movement and aluminum was developed for strong light weight support of airship frames. Count Ferdinand Von Zeppelin developed the best airships in that great age of airships.

Unfortunately, airship technology was applied to war purposes with devastating effect on German enemies (the Allied forces). The Allies could shoot the airships full of holes but they wouldn't explode because bullets could puncture the gas bags (which would allow hydrogen and oxygen to mix) but couldn't ignite the mixture. Also,

the airships could fly at altitudes that were difficult for planes to reach.

The airships wouldn't crash because once their ballast (bombs) was dropped, they didn't need much hydrogen to keep them in the air, so leaks didn't matter. Even if an airship did 'crash', it would just settle gently to the ground.

After the first world war, Germany used it's technological experience to set up a **worldwide** airship transportation system. The speed and comfort of those commercial ships was unequaled in it's glory. Sort of like floating through the air on a huge cruise ship, with all the comforts of home. Speeds up to 200 miles per hour were attained, using various air currents.

May 6, 1937 the German dirigible 'Hindenburg' had a fire start near the tail section as it approached it's docking station near Lakehurst, New Jersey. Thirty six passengers and twenty two crewmen died. The world was horrified by the disaster and the airship age was over.

What is not generally known is that sixty-five people 'walked' (more likely ran) away from the gondola after it reached the ground. Almost all the fatalities were caused by people leaping from the burning craft and falling to their deaths.

When hydrogen burns it produces almost no radiant heat (ten times less than hydrocarbon flames), so you can stand quite close to a hydrogen fire without being burned.

Hydrogen rises so rapidly that the flames rose away from the gondola (passenger and control cabin) located on the bottom of the dirigible.

If proper escape measures had been applied, there would have been almost no deaths. This is quite different from modern planes, where a crash usually involves a large number of deaths.

Before the Hindenburg disaster there had been **no** commercial airship fatalities. Because of the extreme safety record of the entire fleet of German airships, and the strange circumstances of the explosion, the Hindenburg disaster is thought to have been caused by sabotage.

The German airships had to use hydrogen because the United States of America had a monopoly on most of the helium supplies known. Helium is a 'lighter than air' gas that is not flammable. The USA passed a law preventing helium from being sold to most foreign markets. Helium filled airships will lift only 92 percent of the weight that hydrogen filled airships lift, but they will not burn because helium is an inert gas.

The German attempt to use airships in World War II was short lived. The Allies had invented tracers (bullets that burn in flight) so they could puncture and ignite the gas bags. They also had planes that could reach the height of the airships. Airships filled with hydrogen are not very practical when a single tracer shot into it nearly anywhere could shoot it down. Air ships are very large targets and easy to hit.

The USA has been continuing research of airship uses, but with helium as the lifting gas. Even today airships have hundreds of uses, but that's another story.

Today hydrogen is produced by the billions of pounds. It is used as a rocket fuel; hydrogenation of fats, oil, margarine, and soap; the production of fertilizer; synthesis of nylon and polyurethane; glass manufacture and for thousands of other commercial processes.

There are a few scientists and research facilities dedicated to coming up with practical solutions that will create what would become known as a 'hydrogen society'. This society would stop pollution problems like smog, acid rain and global warming. Hydrogen can be used to power nearly everything we use today.

EAGLE-RESEARCH HYDROGEN RESEARCH

I have had some experience generating hydrogen and oxygen in the past. I chuckle when I think of my first experiments, using table salt and water. I've come a long way since then and I hope to be able to impart some of that knowledge to you.

Setting up an electrolyzer to split water into hydrogen and oxygen is a simple experiment and the gases generated are very pure. Thus, I usually set up an electrolyzer whenever I've needed pure hydrogen and/or oxygen.

I have been working on a fuel-saver project that I call HyZOR. This is to be an on-board hydrogen generator that would produce hydrogen 'on demand' to help the engine's combustion.

The HyZOR research is based on the German airships technology. The airships were propelled by the huge diesel engines operating the propellers. As the diesel fuel tanks were emptied, the airship was lighter, thus would tend to rise

higher in the air. To prevent the rise, some hydrogen would be vented. The engineers operating the engines thought that was wasteful and came up with the idea of venting the hydrogen through the engine, thus burning a diesel-hydrogen mixture. This increased the effective fuel range of the airship about 25%.

When German engineers tried it on the ground, in vehicles, they were pleased to note that they could actually run an electrical generator to produce hydrogen (in an electrolyzer) as the vehicle operated and the efficiency gained (more power from the diesel or gasoline) by the addition of a little hydrogen was more than the power required to operate the generator. Thus a net gain in mileage per gallon.

Over the years, there have been many studies of this effect and it is possible, today, to go out and buy an electrolyzer to put on your gasoline or diesel vehicle. My HyZOR research, in combination with my Energy Conserver research has come up with a method that allows twice as much hydrogen to be produced as the present commercial electrolyzers, with no more electrical 'load' on the present generator installed in the vehicle. You'll read more about that in my HyZOR manual, when I get a chance to write it.

Because of my previous research, I have acquired a reasonable amount of data on generating hydrogen, mostly concentrating on electrolytic means.

A portion of my accumulated research data was about Brown's Gas, the effects of which I found quite interesting, not only because of its obvious commercial uses but because the effects were different than a 'normal' hydrogen-oxygen mixture.

When I was in Seattle during December of 1993, I was introduced to some information (from MAXA) that I thought would work for producing small Brown's Gas generators, extremely simple, and less expensive than Yull Brown is asking for his machines.

Since I wanted to experiment with Brown's Gas and found Brown's generator prices beyond my research budget, I thought I would build my own. Also, I always have in mind writing books and distributing information. I could see enough interest and potential in Brown's Gas to justify my time.

I returned to my shop and set up a series of experiments. During these experiments I learned the exact meaning of Kurt Lewin's words '**If you want truly to understand something, try to change it**.' Here I was trying to change a quarter century of work done by Yull Brown and millions of dollars of research done by the Chinese. I have learned a lot, which I will share with you in this series of books. I still have much more to learn, compared to the knowledge that Yull Brown has. After reading this book you'll see why I hope Yull can complete and publish his knowledge; just imagine this bit of knowledge to be a puddle compared to Yull's ocean.

HISTORY OF YULL BROWN AND BROWN'S GAS

Just before World War II, a Bulgarian seminary student, Ilya Velbov, while reading his Bible, a passage from Saint Peter's second epistle caught his attention, a prophecy that one day the earth will be 'consumed by fire'. He wondered how a planet of water could be consumed by fire.

A few weeks later, when reading Jules Verne's 'The Mysterious Island', (written in 1847) he read Cyrus Harding's prediction that America would become the richest and most powerful industrial nation in the world. One of Cyrus's listeners asked, 'But tell me, Cyrus, all this industrial movement for which you predict a continual advance, does it not run the danger of being sooner or later completely stopped for want of coal. . .?' Cyrus answers 'No, my friend, before the coal runs out, water will replace it.' And then Cyrus explains the potential of separating water into hydrogen and oxygen for use as a fuel.

(Authors Note: As a reader of Jules Verne myself, I am constantly amazed at how accurately he predicted technology that could hardly have been hinted at in his day.)

Between the Bible and Verne, the thought of burning water stuck in this young man's mind through his education as an electrical engineer, the terrors of the second World War and the losses that followed it. His wife (a communist) denounced him as 'an enemy to the people'. He was sent to concentration camp for six years hard labor, which nearly killed him. He eventually escaped to Turkey where he was jailed for five years as a 'spy'.

With the help of US Army Intelligence, he was able to emigrate to Australia in 1957. Once there he changed his name to Yull Brown and started applying his considerable electrical engineering skills to helping Australian firms.

After ten years, Yull, an inventor at heart, decided to make a go of it on his own. Yull quickly found out several things about the inventing business. It is not enough to invent a new device, you must then apply equal innovation to try to sell it. For various reasons (of which your author is intimately familiar) the world **does not** 'beat a path to your door.'

However, he managed to continue inventing and (in 1972) started working on his 'Fire from Water' experiments. It took him years of experiments before he was able to operate a vehicle engine on hydrogen and oxygen created by his innovative generator design.

(Author's Note: A water 'electrolyzer' and a hydrogen-oxygen 'generator' are one and the same thing. In literature you will find the names used equally freely.)

When Yull did operate an engine on 'water', the story spread like wild fire around Australia. He was shown on television filling his fuel tank with a garden hose. The rumors stated kit production at $400 that would operate a vehicle for a year on ten gallons of water.

To put the story straight, Yull Brown invited the public to a demonstrations of his 'Brown's Gas'. With a 'wolfish' grin, he has proceeded through a series of presentations that showed 'impossible' effects and their practical applicability to industry.

He showed the nearly colorless flame. He waved his hand through the flame in a manner that would have boiled his skin using an oxy.-acet. torch, showing the relative 'coolness' of the flame. He burned through fire brick like wood, making a fairly neat hole. He formed a bead of fire brick that he claimed would have a hardness of 9.5. He sublimated (turned from solid to gas) a tungsten rod (requires 6000°C), showing that the flame changes temperature depending on its reaction to various materials. He welded aluminum to aluminum with no inert gas. He welded aluminum to brass and he welded a steel rod to an ordinary building brick. Then he fused glass to a brick.

All this with gas that he generated 'on demand' using only water and electricity. The 'gas' torch being simpler to operate than oxy.-acet. because there is no 'mixing' involved; Brown's Gas is generated at its exact correct mixture. No gas bottles, no gas storage. And the actual cost of the gas is less than oxy-act.

Then, using a steel container, some hoses and a transparent container, he demonstrated that Brown's Gas is 'implosive' not 'explosive'. He filled the steel container with water, then forced the water out by injecting Brown's Gas. The expelled water filled the transparent container (through the hoses). Then he ignited the Brown's Gas in the steel container; it made a 'ping' sound and the water from the transparent container rushed back into the steel container. The 'implosion' had made a nearly perfect vacuum in the steel container, 'sucking' the water back into it.

Note: temperature rise in container after implosion was 4.3°C.

Then he pointed to his vehicle, which he told them he'd driven around Sidney 'on nothing but my mixture' and the exhaust was 'pure water vapor'. He cooled some of the steam coming out of the exhaust pipe, put it in a cup and drank it!

Note: The vehicle was a Ford Prefect, V8 engine, 2 batteries to run the electrolyzer. During various experiments, the Ford operated over 1,000 hours in the shop and made a short excursion into Sydney.

Yull Brown states that one gallon of water will power a car for 1,000 miles, even using explosion technology. **Note**: If you mix the Brown's Gas into the air going into an engine, it will explode, not implode.

Nevertheless, even with this demonstration, very little was able to be done with Brown's Gas, for all the typical reasons that happen to most new innovation. The reasons are detailed and reasonably covered by reference to this book's bibliography. Here I will just note the four major restrictions.

First, there is a huge inertia for companies to simply continue with the technology that they know and have invested in. You've got to come up against this inertia to really realize the power of it. I have personally come against 'vested interest' with some of my innovations.

Second, there is a general dis-belief in new technology, (even when demonstrated), by individuals, companies, learning institutions and government agencies. A large part of this dis-belief is because new theory needs to be developed to explain the phenomenon. As one chemical engineer of Cal Poly (Pomona, CA) put it '**If it's not understood and isn't explainable, then it doesn't exist!**'. The inventor usually has trouble explaining to the satisfaction of

everyone concerned, he sometimes has trouble understanding it himself.

Yull Brown believes that it is not his job to precisely define theory. He feels his job, as an inventor is to develop practical uses for a demonstrable effect.

Authors Note: Think about it, we all use demonstrable effects such as gravity (sit on a chair) and electricity (turn on a light) but we really don't know what they are. An inventors job is not to define these things, but rather to develop innovative devices (better chairs and lights).

Third, there is a bottle-neck of the inventor himself, he simply cannot be everywhere at once to talk to all the people who need this technology AND he spends a great amount of his time and money defending his patents and proprietary innovations AND he keeps certain critical information to himself. This bottle-neck usually impedes further development of the technology till his patents run out and he can no longer control or receive much benefit from his research.

This author bypasses this problem by making his research 'public domain'. Therefor anyone is free to duplicate his technology without restriction. This way of proceeding has several unexpected side benefits to the author. First, the author welcomes duplication that not only verifies the research but usually introduces new innovation as well. Second, the author finds himself called in as an advisor to this research, therefor learning as much as he teaches. He can then teach more to others, so the technology grows. Third, the author finds himself with many commercial opportunities because of the 'spin-offs' of giving away the technology. Fourth, the author is free to continue his research instead of spending time trying to protect technology that can't be protected economically. Fifth, technology that is freely given can't be 'stolen'; so the author lives a happy life with no 'resentments'. Sixth, if there are any problems with the technology, (safety, economic, political) many minds help solve the problems and the solutions are freely distributed. Although the author's method may not be for everyone, he thinks that this method should be considered by more inventors. The author makes money from day one with the results of his research. Most inventors spend huge amounts of money and make none by trying to hold research confidential and proprietary.

Fourth, there is both passive and direct interference from 'vested interest' groups that control technology that would be made obsolete by Brown's technology. Shots were actually fired into his kitchen. He had to have a special vehicle built just to protect himself. Attempts to slander him were mostly successful. For a few years after his demonstrations Yull Brown was able to accomplish very little.

This author has also felt this direct interference for several of his innovations and has in his files over 80 other examples of it. This author's method of making all new information 'public domain' seems to pretty well neutralize this interference, because it is nearly impossible to suppress thousands of people world wide who have free access to the technology.

Finally, Yull Brown started looking to foreign countries for development. In the USA, he found the interest of a few individuals and companies but no one with the resources willing to develop his technology. Also he found much of the same problems (the big four mentioned) as he found in Australia.

So he accepted an offer to present his technology to the Chinese People's Republic. The Chinese have developed the technology to its present state and have developed the water torches to a marketable item.

(Updated note: Yull Brown is now dead, dying on May 22, 1998, in Auburn, Australia. You can purchase Brown's Gas water torches from a fellow by the name of Dennis Lee. Mr Lee took over the sales of the China version of the Brown's Gas electrolyzers by negotiating directly with the Chinese (sending them a tape of Yull Brown speaking badly about them), causing them to cut off Yull Brown and sell the machines directly to Dennis Lee. Yull Brown returned to Australia a sick old man who has now died.)

BEGINNING EXPERIMENTS WITH BROWN'S GAS

- **Experiment One**

I placed two copper plates .0625 inch (1/16') from each other in about 276 ml (just over a cup) of de-ionized water. The plates were about .5 inch high by 1.5 inches long. They were held together by plastic bolts and apart by plastic washers. I soldered #14 solid copper leads to the plates. I plugged this directly into 120 VAC, as I had been assured (by MAXA)

that Brown's Gas could be produced by AC current.

De-ionized water is much cleaner than distilled water and needs to be stored in an enclosed container, because ions from the air will contaminate it. I use de-ionized water in all my experiments that call for water.

Because I was using line power, I had only about 15 amps of current available to me. My electrolyzer as described in Experiment 1, drew only .5 Amp of current but went from 20°C (68°F) to 50°C (122°F) in ten minutes and to 94°C (201.2°F) in 25 minutes from the start of the experiment.

I got all excited because there was a lot of gas. But I thought some of it must be steam, because of the high temperature. So I sealed my electrolyzer, assembled a condenser to separate the steam from the Brown's Gas and directed all the vapors through the condenser, and then to a 'displacement' container. I figured the steam would condense (turn back to liquid) and drain back to the electrolyzer. I figured the Brown's Gas (being oxygen and hydrogen) would remain in a vapor state when cooled and would displace water in my displacement container. By condensing the steam, I found that the vapors being produced by the electrolyzer were nearly all steam (99.99%).

So much for copious Brown's Gas. So much for a simple AC application with no electrolyte and no transformer. Also note that what hydrogen and oxygen were produced by this method was definitely NOT Brown's Gas.

I did discover that the plates allowed the most current flow when they were in a horizontal position (plate surfaces vertical but depth shallow), so that the bubbles could remove themselves from between the plates quickly, allowing more liquid to come in from underneath. Bubbles between the plates impedes the electrical flow that produces more gas.

I also discovered that the electrical forces involved were powerful enough to rip the molecules right out of the copper plates. When operating this experiment for a period of time the water becomes cloudy with copper. When examined, the plates show obvious loss of copper.

A side effect of this experiment seems to be 'over-unity' heat. Over-unity means that more energy is produced by a device than is supplied to it. To take 276 ml from 20°C to 50°C in ten minutes indicates 34,643.52 joules. The electrical power used was about 36,000 joules. This may not seem to be over unity on the face but you must remember that this was an open container at 3000 ft elevation with no insulation to prevent radiation, conduction and convection losses.

I ran a side experiment with electric resistance heaters drawing the same amperage at the same voltage in the same container with the same volume of water and it took twenty minutes to go from 20°C to 50°C and almost an hour to reach 85°C (185°F). The electric element was never able to bring the water to a full boil.

I also discovered that DC current flow (with set-up as per Experiment 1, but with a bridge rectifier installed) at this high voltage still produced the 'over-unity' heat. I duplicated this experiment several times and have had friends duplicate it.

However, getting back to the original experiment, high voltage (AC or DC) and no electrolyte did not produce significant amounts of H_2 and O_2, and what was produced was certainly not Brown's Gas. The high voltage seemed to cause the H and O to reduce directly back to water as soon as it formed in the electrolyzer; with the net result of simply converting electricity into heat.

- **Experiment Two**

But I still had a few ideas to try. I know that current is the key to generating oxygen-hydrogen, not voltage. I know that high voltage will not produce Brown's Gas.

I built another electrolyzer. This time with six sets of plates the same size as Experiment 1. They were stainless steel, which I've found to be a good electrolyzer plate material. And they were set up positive, negative alternating, so both sides of most of the plates was active.

I set the plates into a sealed mason jar (.5 liter) with a hose out the middle of the top for the Brown's Gas and a hose starting at .5 inch from the bottom of the jar and proceeding through the lid to a surge tank mounted three feet above the electrolyzer. This arrangement was to provide automatic pressure control, automatic amperage control and intake water to the electrolyzer.

If the pressure in the electrolyzer rises above the gravity pressure of the water (1.3 psig) then the water would travel backwards up the tube to the surge tank, emptying the electrolyzer and causing the level of the water in the electrolyzer to drop as the liquid was forced out.

I used a water solution saturated with sodium hydroxide (lye). I kept mixing the lye into the water till the solution wouldn't take any more and then I let it sit for a couple of days at room temperature, to let the excess crystallize out when the mixture cooled. I used only de-ionized water because it is more pure than distilled water.

Note: Potassium hydroxide (caustic soda) is slightly more efficient than sodium hydroxide (lye) but sodium hydroxide is less expensive and easier to get. See your local grocery stores for drain cleaner products and choose one that is pure sodium hydroxide. Drug stores will sell it to you too, but at a much higher price.

Safety Note: When mixing chemicals like lye (sodium hydroxide) and water. Put a little lye into the water at a time, till you have the mixture you desire. Too much at a time will cause a violent spitting that will splash the electrolyte out of the container. Wash any spills with lots of fresh water.

The automatic pressure and water feed worked great. But my electrolyzer plates were too close together. Capillary action (adhesion and cohesion) kept solution between the plates after the solution level had receded below the plates. The solution between the plates allowed the plates to 'contact' each other as normal and the plates kept on producing oxygen-hydrogen. The additional hydrogen/oxygen volume caused the solution to be completely removed from the electrolyzer, up to the surge container.

This was bad, because I simply wanted the electrical action to stop when the solution level dropped to just beneath the plates; this would cause an automatic 'level control' and electricity shut-off effect similar to Yull Brown's patents in my bibliography (which have expired and are now public domain).

Note: In this type of electrolyzer, I find I must increase the distance between my plates to at least 1/8th inch (.125') to prevent this capillary action and allow the fluid to drain from the plates.

Note: Having the plates close together is important, because it reduces the resistance to current flow across the gap between the plates, this lowers the voltage required to 'push' the current, this leads to an increase in the efficiency of the electrolyzer. The plates also need to be as parallel to each other as possible, otherwise the reaction tends to concentrate on the 'closer' areas instead of being evenly distributed over the whole plate. But if the plates are too close, the gas bubbles tend to interfere with the current flow between the plates. Gaps of 1/4 inch do not appreciably lower electrolyzer performance but do limit the number of plates that you can have in your electrolyzer.

The next problem to solve was the excessive current draw. When I was working with pure water, which has a very high resistance to electrical current flow, there was no problem with limiting the amount of current.

But, when you have your plates in a warm solution of sodium hydroxide, there is very little resistance and thus a major amp draw when 120 VAC is applied (effectively a 'short circuit'). I placed a full wave bridge rectifier across the electrolyzer and fed it with 120 VAC (as before) but I put a **current limiting capacitor** in the AC line, in series.

This worked extraordinarily well, for several reasons. I found, using the current limiting capacitor, that my voltage across the actual electrolyzer was reduced to exactly that needed to push the current across the plates! This meant I could get my voltage reduction without a transformer!

Later, I discovered that this technique was not only more efficient than using a transformer, but the electrolysis effect was made more efficient by the peculiar wave form that this particular circuit causes. Apparently, the pulsing action of this particular circuit is very important to the production of Brown's Gas. I figure the pulsing prevents a particular reaction from taking place that would take place with continuous current. More on this later.

By experimenting with the size of the capacitor, I could vary the current across the electrolyzer. The voltage across the electrolyzer stays at about 2.1 VDC, unless you vastly exceed the capability of your plates and electrolyte to transmit current flow.

I then tested the device (capacitor power supply) using a watt-meter and found that the capacitor circuit was **EXTREMELY** efficient, much more so than normal transformer circuits.

Example: You are feeding the electrolyzer 5 Amps at 120 VAC and only using 5 Amps at 2.1 VDC. You must remember to subtract the voltage that exists in the capacitor from the source voltage, because capacitors do not 'consume' power

and whatever voltage is 'stored' in the capacitor reduces the voltage coming from the source in a most efficient manner.

The efficiency of the Capacitor Power Supply is due to the capacitive reactance of the capacitor. If the capacitor is 'storing' 118 volts, then this voltage must be subtracted from the power supply voltage (120 volts). Thus the actual wattage is much less than first indicated by direct measurement of the input voltage and amperage. (120 volts - 118 volts) x 5 amps = 10 watts.

A spin-off of this research is my Capacitive Battery Charger (CBC). The CBC is superior to all transformer chargers I've tested and is extremely easy to assemble. The CBC charges batteries faster than it should, considering the amount of electricity it 'consumes.' In addition, the CBC can recharge sulfated batteries that transformer chargers won't recharge, saving batteries that would otherwise have been tossed into the garbage. You can learn about the CBC by ordering the CBC pamphlet.

I ran a side series of experiments using AC current at low voltage (both with transformers and with capacitors) and found very little gas to be formed. I think that it takes time for the current to flow across to the other plate and for the chemical reaction in between the plates to take place. I conclude that for an electrolyzer to work properly, DC current must be used.

I used a bridge rectifier to get DC current flow across the electrolyzer. Finally, I noted copious amounts of gas forming off both plates. But was it Brown's Gas?

Setting up displacement apparatus showed me that I was getting more gas than I should, according to standard chemical calculations, thus I assumed that at least a portion of the gas was Brown's Gas, based on the calculations that I show you later.

I also noted that my electrolyzer **stayed very cool** during this process. This is important, because later I discovered that an electrolyzer that is producing Brown's Gas stays cool. An electrolyzer that is producing ordinary H_2 and O_2 heats up. I'll explain more later.

There is another side effect to the above 'capacitor current limiting' version of a high voltage source to feed a Brown's Gas electrolyzer. It works fine, and the voltage stays at 2.1 VDC as long as there is fluid between the plates, but when the fluid is gone from between the plates, the plates act like capacitors and build up a voltage because the current can't go anywhere.

I had this voltage rise happen to me. Somewhere on this voltage rise, **my electrolyzer imploded**. It couldn't hold the sudden vacuum and sprung a leak.

I had left my electrolyzer running to see what would happen. I kept the output hose shut off, so the pressure building in the electrolyzer would force the liquid out of the electrolyzer. The electrolysis was supposed to stop when the liquid fell below the level of the plates. (This being an automatic current limiting function similar to actual Brown's Gas electrolyzer designs)

But the electrolysis did not stop, because some fluid was trapped between the plates (as I explained before). As the fluid was electrolyzed away, from between the plates, the voltage across the plates remained 2.1 VDC. The extra gas started to surge backwards up the liquid input hose and vent through my de-ionized water storage surge tank.

As this process was taking some time, I walked into the next room to grab a sandwich. I heard a sound like a poofing pop, like a child's popgun fired. I ran back into the room just in time to see the electrolyzer finish filling itself with water. The implosion had created a vacuum that sucked water into the electrolyzer with great velocity.

Note the automatic reaction of an inventor to run **into** a room where something unexpected is taking place. They say 'Curiosity killed the cat,' and I'm sure it has gotten some inventors too.

It is significant that I had an implosion with the low voltage pulsed current that suddenly went to high voltage, because during a set of experiments proceeding that one, I had used a 12 volt vehicle battery to cause the liquid between the plates to electrolyze away much faster. The particular plates I had would draw 30 amps at 12 volts. Once the fluid was boiled away, there was 12 volts across the plates and the mixture did not implode (or explode for that matter).

Either Brown's Gas will stand 12 volts across the plates, or the gas I had generated with the straight 12 VDC current (not pulsed) was not Brown's Gas. Due to other experiments I've done, I believe it was not Brown's Gas.

The implosion indicated that I had been making (with low voltage pulsed current) Brown's Gas. The implosion also indicated that

Brown's Gas must be formed with as little voltage as possible. This is a very important statement, please remember it.

I had tested my plates at 600 volts (in open air) before installing them in the electrolyzer. So I know that in open air no electrical arc will occur across these plates, even placed as closely together as they were. And the maximum voltage possible across the plates is 170 VDC from a 120 VAC source, BUT somewhere before the voltage reached 170 VDC, the Brown's Gas imploded. More on this later.

Also remember that I formed actual Brown's Gas with a pulsed current flow. There is possibly a 'best' pulse rate to be applied to various Brown's Gas generator designs, but for now, I use 120 pulses per second, that being the pulse rate from the bridge rectifier on 60 cycle per second power.

Upon testing my container after the implosion, I discovered I'd sprung a leak. I had used 'silicone' to seal my electrolyzer. As I had designed the container to operate with pure de-ionized water, this was no problem. But when I put a solution containing sodium-hydroxide (Lye) into it, the lye degraded the silicone (made it slimy). In a short period of time I would have had leaks anyway. I tell you this to emphasize that you must be careful of the materials you use in constructing any electrolyzer but most particularly a Brown's Gas electrolyzer.

PROPERTIES OF HYDROGEN

2 ml of H_2 will dissolve in one liter of water. This is important as water absorbs much more oxygen , thus upsetting the mixture of the Brown's Gas.

A hydrogen molecule (H) is given the atomic number of 1 and has the atomic weight of 1.008. Normally, hydrogen molecules don't like to be alone, so they join up with another hydrogen molecule, so 'normal' hydrogen has two hydrogen atoms (diatomic) and it has a molecular weight of 2.016. Hydrogen to hydrogen atomic bond energy is 104.2 Kcal. per mole.

Hydrogen is the lightest of all elements known. It is rarely found free in nature. It is the simplest element known, each atom having a nucleus of a single proton with only one electron revolving around it (mon-atomic form).

Hydrogen is one of the most abundant elements available to us. But to get any, we have to liberate it from molecular bond with other elements. When hydrogen is in it's gaseous form, it dissipates in air and rises out of reach in the atmosphere very rapidly.

A spill of 500 gallons of liquid hydrogen on the ground will diffuse into a non-explosive mixture in about one minute, faster if there is a breeze. Hydrogen diffuses through air 2.82 times faster than methane.

Hydrogen is a solid at -259.1 degrees C (-434.56 F). Hydrogen's boiling point is -252.7 degrees C (-422.98 F), at atmospheric pressure. The critical temperature of hydrogen, above which it cannot be liquefied at any pressure, is -240 degrees C. In practical terms all the above means that we (for the purposes of this book) are always going to be dealing with hydrogen in it's gaseous form.

Hydrogen's vapor specific gravity is .06953, at 21.1 degrees C (70 F), (air =1) and one bar (14.7 psia). Hydrogen (H_2), has a density of 0.00009 gram per milliliter.

Hydrogen is an inorganic, odorless, tasteless and colorless gas.

Hydrogen burns with a colorless flame, and hydrogen's auto-ignition temperature (when mixed with oxygen) is 570 degrees C (1058 F).

Both the proton and the electron of atomic hydrogen have two possible directions of spin. In the hydrogen molecule (H_2) the nuclear spins of the atoms may be either parallel or antiparallel. This allows two types of hydrogen molecules, orthohydrogen and parahydrogen, the usual ratio being about three to one. Parahydrogen can be formed from orthohydrogen at very low temperatures in the presence of a catalyst.

In 1932, Harold Clayton Urey announced the discovery of an isotope of hydrogen (originally called heavy hydrogen, H^2) that was named Deuterium (D). D is double weight hydrogen, it has a neutron in addition to its proton. It is also possible to have triple weight hydrogen, Tritium (H^3, commonly written as T), which is which has two neutrons with its proton.

During electrolysis, the 'protium' or ordinary hydrogen atomic bonds are broken easier than the Deuterium atomic bonds. As Deuterium exists in ordinary water, at about the ratio of 5000:1, this means a gradual buildup of heavy water in an electrolysis cell. Tritium also exists in ordinary water but at very small quantities.

An invisible gas, hydrogen will explode in nearly any concentration with air, if ignited. About 20 micro-joules will ignite hydrogen (when it is in a perfectly combustible mixture with oxygen); this is about five times less energy than required to ignite a gasoline mixture. However, open air concentrations of hydrogen are much harder to ignite, sometimes requiring an initiator such as a blasting cap.

An open air hydrogen flame shoots upward at about 2.75 meters per second.

Open air/H_2 flame temperature is about 2,150°C. An H_2/O_2 flame temperature is about 2,800°C.

Hydrogen's lower explosion limit by volume in air is 4 percent, and the upper explosion limit by volume in air is 74.5 percent.

H_2 flammability limits in oxygen (O_2) is 4.6-93.9% by volume.

When confined in an enclosed space, hydrogen can be detonated in a range of 18 to 59 percent (by volume) in air. Detonation is a much faster burn than explosion.

H_2 detonation limits with oxygen in an enclosed space is 15-90% by volume.

The flame speed of hydrogen is very dependent on its ratio with oxygen and the absolute pressure of the mixture. At perfect stoichiometric, flame speeds are recorded from 7 to 32 ft/sec. And detonation speeds as high as 30,200 ft/sec. Hydrogen burns much faster than hydrocarbon fuels, so the kinetic energy of its burn (explosion) is much greater for the same BTU rating of other fuels.

Kinetic energy of mass increases per the square of the velocity of the mass. This is an important concept. If you move a ball at twice the original speed, you have four times (2 squared) the energy. If you move the ball at three times the original speed, you have nine times (3 squared) the energy. Thus, a BTU value of hydrogen can have hundreds of times more potential energy than a BTU value of gasoline, simply because it burns faster. The trick is first to get it to burn fast and then to be able to gather (and use) the energy of the fast burn.

For reference; gasoline burns at about 2 ft/sec and dynamite explodes at about 16,000 ft/sec. A vehicle's engine uses about 3 BTU of gasoline every time a cylinder fires. Three BTU of dynamite would break the engine, because the piston couldn't move fast enough to make use of the velocity of the explosion, so the velocity would shatter the piston and/or the head.

When ignited with oxygen, hydrogen produces 325 BTUs per cubic foot or 62,000 BTUs per pound. A BTU is the heat required to raise one pound of water (about 1 imperial pint) one degree Fahrenheit.

Hydrogen (H_2) is weakly repelled by a magnetic field (diamagnetic). But as an ion, it is attracted to magnetic fields.

Commercial hydrogen is produced from methane (natural gas) by passing methane and steam over hot iron. Hydrogen produced this way is four to five times more expensive than gasoline.

Being the world's smallest molecule, hydrogen has the ability to pass through nearly any material. Different materials have 'permeability' rates that should be considered, because hydrogen will leak out of places much faster than oxygen, thus upsetting the 'stoichiometric' ratio of Brown's Gas.

Note: Water has a very low permeability to hydrogen, you can seal hydrogen in under water containers.

In its mon-atomic form, (H) hydrogen is even smaller and its leakage rates are faster. This is important to remember for several reasons, which I'll explain later.

PROPERTIES OF OXYGEN

Oxygen (O) has an atomic weight of 16. But, like hydrogen, doesn't like to be in its mon-atomic form, so joins up with another oxygen to be a di-atomic molecule (O_2), which has an atomic weight of 32.

The molecular bond strength of di-atomic oxygen (O_2) is high, 118 Kcal per mole. Ordinary bond strength of oxygen to oxygen when the oxygens are in a compound is about 33 Kcal per mole. This is an extremely important piece of information, because it is this difference in bond energies that makes most of our power for our civilization, as we burn (oxidize) fuels.

Ozone (O_3) is a tri-atomic form of oxygen. But this form is not very stable and disassociates fairly easily.

There are isotopes of oxygen that have different atomic weights

than 16. Isotopes weighing 17 and 18 have been found, due to extra neutrons associated with the protons in the core of the atom.

Oxygen is a colorless, tasteless, odorless gas. It is very reactive, having the ability to combine with most other elements.

The critical temperature of oxygen is -118°C. Above this temperature oxygen cannot exist as a liquid. So we will be dealing with oxygen as a gas.

One volume of liquid oxygen will make 862 volumes of gaseous oxygen at 'standard' atmospheric temperature and pressure (70°F @ 14.7 psia).

The density of gaseous oxygen at 0°C is 1.429 grams per liter (0.0892 pound per cubic foot). Oxygen (O_2) has a density of 0.001429 gram per milliliter.

At 25°C, 31 ml of O_2 will dissolve in 1 liter of water, as opposed to 2ml for H_2. This is important to note, because here we have something which could upset our 'stoichiometric' ratio before we even get the Brown's Gas out of the electrolyzer.

Oxygen is paramagnetic. Which means it is attracted to a magnet. So the magnetic fields in our electrolyzer could upset our homogenous mixture of Brown's Gas. This includes the magnetic field created around a wire that has electrons flowing in it.

CHEMISTRY OF ELECTROLYSIS

First I will define a few words, then set some parameters and give a few basic chemical facts. Then I'll go into the electrolysis. Then I'll explain why I believe Brown's Gas is different from normal oxygen-hydrogen mixtures. I assure you that an understanding of how electrolysis works is basic to understanding why Brown's Gas works.

An atom is the smallest stable building block in chemistry. An atom has one or more electrons (negative charge) spinning around a nucleus composed of at least one proton (positive charge) and usually some neutrons (no charge). A hydrogen atom has one electron and one proton. An oxygen atom has 8 electrons (6 in its outer shell) 8 protons and 8 neutrons.

A molecule is a composition of more than one atom. Molecules composed of the same kind of atom are called elements. Molecules composed of more than one kind of atom are called compounds.

In chemistry, a 'mole' is not a small animal that digs in the ground. A mole is a **specific number** of atoms, molecules or compound units. The number is called Avogadro's Number and is 6.022×10^{23}. By defining the 'mole' Amadeo Avogadro made possible the interpretation of the behavior of gasses in terms of reacting atoms.

The 'molecular weight' (sometimes called formula weight) of a molecule or compound is the sum of all the atomic weights of all atoms in its molecule. Water is H + H + O = 1.008 + 1.008 + 15.999 = 18.015.

'Gram Molecular Weight' is equal to its molecular weight, in grams. Water is 18.015 grams per mole. Also stated as one 'gram-mole'.

'Gram molecular volume' allows us to find out the volume of a gram molecular weight of a gas at standard conditions. For example, the density of hydrogen = 0.00009 g/ml and hydrogen gram molecular weight = 2.016, so the formula is thus;

$$\frac{0.00009}{1} = \frac{2.016}{x}$$

$$x = 22{,}400 \text{ ml} = 22.4 \text{ liters}$$

Again, Avogadro's Number is 6.022×10^{23}, and is the number of molecules in a mole. At standard conditions a mole of any gas will have a volume of 22.4 liters. The weight of a mole changes, depending on what atoms are involved, but its volume is constant.

'Oxidation' is a process involving the loss of electrons. This means oxidized atoms have a positive valance number, because the negative electrons in the outer valance (electron shell) no longer balance the positive protons in the nucleus.

'Reduction' is a process involving the gain of electrons. This means reduced atoms get extra electrons added to their outer shell and the atom becomes negatively charged.

'Redox', (reduction-oxidation) means the reactions balanced in the solution and (usually) the result is a neutral charge. In electrolysis, Redox is accomplished by the 'flow' of electrons from the cathode to the anode (negative to positive). As the various compounds get split and new molecules and compounds form, various reduction and oxidation processes happen.

While studying electrolysis, Michael Faraday discovered a definite relationship to the quantity of elements formed in electrolysis and the amount of electricity used in the process. He formulated two laws:

(1) The weight of a given element liberated at an electrode during electrolysis is directly proportional to the quantity of electricity which passes through the solution.

(2) When the same quantity of electricity passes through solutions of different electrolytes, the weights of the substances liberated at the electrodes are directly proportional to their equivalent weights.

A 'Faraday' is a current equal to 96,500 coulombs. A coulomb is the flow of one amp per second. A Faraday is equal to 26.8 amps per hour (96,500/3,600 seconds), regardless of the impressed voltage.

This is very important, as it is current flow that causes electrolysis to happen. Voltage doesn't matter directly, you only need enough voltage to push the current through the cell, any more than that is wasted wattage and an inefficient cell. The voltage across the cell is used only to figure the wattage of the cell. The less voltage needed to move the same amperage, the more efficient the cell.

The theoretical perfect voltage of an electrolysis cell of this nature is 1.23 volts.

I've heard a rumor that one group of individuals has a cell made with 'expanded' metal electrodes that allow less than a volt drop across the cell. I am trying to track this down, because this would be a very significant innovation.

A Faraday will liberate one gram equivalence of a substance at each electrode. Thus, the passage of 26.8 amps/hr will liberate one gram atom of hydrogen (one mole) at the cathode and eight grams of oxygen (one half mole) at the anode.

One gram-mole of H would occupy 22.4 liters of volume and weigh one gram. One gram-mole of H_2 would occupy 22.4 liters and weigh two grams.

A gram-mole of water weighs 18 grams. Since a gram of water equals one cubic centimeter and one milliliter, a gram-mole of water occupies 18 cc or 18 ml.

Because one gram-mole of hydrogen molecules equals 1/2 gram-mole of hydrogen (H_2), the hydrogen would occupy a volume of **11.2** liters, at standard pressure and temperature. Because oxygen is produced at exactly the same time but at half the volume, eight grams of oxygen (O) is produced, which is 1/2 gram-mole of oxygen (O), occupying 11.2 liters as O, and as O_2 would occupy **5.6** liters of volume. This is **16.8** liters total gas volume (H_2/O_2), per Faraday. (33.6 liters H/O, per Faraday)

Electrolyzing **two** gram-moles of water (about 36 grams) would cause about 67.2 liters of volume to be occupied by gas at standard temperature and pressure (four moles of H and two moles of O). Or 1.866 liters of gas per gram of water (67.2 liters divided by 36 grams).

This means that 1 kilogram (1 liter) of water (1,000 grams or 1,000 cubic centimeters) will occupy 1,866.66 liters of volume if electrolyzed. This is close to the figures of Yull Brown's literature.

In fact, if **two** gram-moles of water were electrolyzed and formed di-atomic hydrogen (H_2) and di-atomic oxygen (O_2). We would have two moles of H_2 and one mole of O_2 at a volume of 22.4 liters per mole = 67.2 liters. Which would make 0.933 liters of gas per gram of electrolyzed water.

We observe that the 'electricity' is transmitted from the negative plate (cathode) to the positive plate (anode) by 'ions' in the solution.

'Ions' are molecules (or atoms) that either have extra or fewer electrons than they would normally. Positive ions (cations) have fewer electrons and negative ions (anions) have more electrons than normal. Pure (de-ionized) water has few ions so does not conduct electricity well.

An 'endothermic' reaction means that energy is put into the reaction. A temperature gauge would show a lowering of temperature of a solution. In a chemical calculation this is indicated by a plus sign (+) and means that heat is absorbed. When molecules are split, energy is consumed in breaking the atomic bonds between the atoms, and is usually an endothermic action.

An 'exothermic' reaction means that after the reaction you had energy left over, which would cause a temperature rise in the solution. In a chemical calculation this is indicated by a negative sign (-) and means that heat is rejected. When you combine molecules, you (usually) get back the exact same energy that you used to split them, and this left over energy is called exothermic energy.

In electrolysis, we find that if we use the proper electrolyte as a catalyst, we can vastly reduce the amount of power required to split water. In this case I'll describe the use of Sodium Hydroxide (NaOH). Sodium Hydroxide is commonly called lye and is a base solution. The use of Potassium Hydroxide (KOH) is nearly identical. The use of various acids as electrolytes works too.

We need electrolytes that don't form noxious fumes, are effective in reducing power consumption and

have a net result of being unchanged in solution (true catalysts).

These electrolytes oxidize on the anode and reduce on the cathode easier than pure water does by itself. Once split, these electrolyte compounds either directly or indirectly attack water to split it, or at least vastly reduce the power required to split it.

Pure water requires a high voltage to split the molecules. Adding an electrolyte 'catalyst' vastly reduces the voltage required to split the water.

Hydrogen gas is formed at the cathode, oxygen gas is formed at the anode. In between the plates there is a complex catalytic reaction involving the water, the sodium hydroxide (NaOH) and electron movement.

During the process, the NaOH is split apart (an endothermic reaction), the resulting ions Na+ and OH- try to go to the cathode and anode respectively.

Sodium (Na+) is extremely reactive to water, so much so that the metal (sodium) must be kept away from air in the laboratory because even water moisture in the air can cause oxidation violent enough to release quantities of hydrogen. The free sodium cation thus causes water to oxidize immediately on contact, reforming itself as sodium hydroxide (an exothermic reaction exactly balancing the endothermic reaction it took to split the sodium hydroxide).

During an oxidation process, electrons are removed from the molecules being oxidized, so the NaOH now has its full set of electrons. The Na+ ripped an H+ from the H_2O, leaving an OH- for itself. The resulting hydrogen cation (H+) heads for the cathode to pick up an electron (reduction reaction) to become a full mon-atomic hydrogen atom (H).

In the process just described, the OH- anion was left alone while the Na+ cation and the H+ cation completed their part of the redox reaction. The OH- (formed when the NaOH is reduced) moves toward the positive plate (anode). When the OH- reaches the anode, it is oxidized (stripped of two electrons, turning H- into H+) and split into mon-atomic oxygen atom (O) and a hydrogen cation (H+). The hydrogen cation immediately leaves the vicinity of the anode on its way to the cathode. Often, it will not go directly to the cathode, it will combine with a OH- and reform into water, then the water will be split again by Na+. When the H+ arrives at the cathode, it picks up the electron it needs to become a proper mon-atomic hydrogen atom (H).

The process is actually more complicated than I just described above because there are many interactions between the H_2O, NaOH, OH-, Na+, H+ and any impurities in the solution. The actual electron flow between the plates would look like a square dance 'pass your partners' as the molecules and compounds are constantly being reduced and oxidized between the plates. The important point to remember here, is that both the oxygen and the hydrogen exist as stable mon-atomic atoms during a portion of the above dance.

Now I come to a concept called '**bond energy**'. Molecules hold themselves together with 'bond energy'. The average bond energy of di-atomic (oxygen to oxygen, O-O) is 118.3 Kcal. Hydrogen to hydrogen (H-H) is 104.2 Kcal. And oxygen to hydrogen (O-H) is 101.5 Kcal. H-OH is 119.7 Kcal. All Kcal figures are 'per mole'.

So when we split an H from water, it takes 119.7 Kcal and when we further split OH into O and H, it takes 101.5 Kcal. This adds up to 221.2 Kcal. These are all endothermic reactions, energy goes in (as electricity) and no excess heat is noted. Let's say we split 2 water moles, for a total of 442.4 Kcal.

You will note that I am usually using two moles of water for my 'bond' calculations, this is because two moles of water make a balanced 'Redox' equation. $2\ H_2O = 2\ H_2 + O_2$. Otherwise I'd have $H_2O = H_2 + 1/2\ O_2$.

When bonds are reformed, it is an exothermic reaction, you get excess heat. When H and H form H_2, there is an excess heat of 104.2 Kcal. And when O and O form O_2, there is an excess heat of 118.3 Kcal. For the two water moles we split, these 'reforming' energies add up to 326.7 Kcal. This is how normal electrolyzers get hot. Some heat is used during the process instead of electricity, to split more water but generally, you must 'dump' this as waste heat. Note that we just formed two moles of hydrogen and one mole of oxygen.

Now we proceed to the torch. During a 'normal' di-atomic hydrogen (H_2) and di-atomic oxygen (O_2) flame, the H_2 and O_2 must first split apart into mon-atomic atoms and then recombine into H_2O. Which means (for two

moles hydrogen and one mole oxygen) we add 326.7 Kcal (the same amount of energy we just had to throw away a minute ago) and then get 442.4 Kcal out. For two water moles, this gives us a total possible heat out of 115.7 Kcal.

115.7 Kcal for two water gram-moles, divided by two gives us 57.85 Kcal per gram-mole. 57.85 Kcal divided by 18 grams per gram-mole gives us a net energy of 3.2 Kcal per gram of water. This is 3,200 calories, enough heat to raise one liter of water by 3.2°C. Using the electricity to directly heat water, we would have had enough energy to raise the temperature of a liter of water by 12.2°C. This is because normal electrolyzers lose most of the H-O potential in the formation of H_2-O_2; more later.

Note that the endothermic 326.7 Kcal needed to split the H_2 and O_2 came from the flame itself, leaving only 115.7 Kcal as left over exothermic (excess heat, or energy potential) when the combination was finally reduced to water.

Thus the flame is 'self propagating' at high temperature. It creates enough heat to split its own molecules apart, which requires

about 2,800°C. This is why a 'normal' H_2/O_2 flame is 'hot'.

Note; the 57.85 Kcal per mole is for H_2 and O_2 reduced to steam, we gain (exothermic) an additional 10.45 Kcal of 'latent heat of condensation' when we go from steam to liquid water.

PROPERTIES OF BROWN'S GAS

During the previous chapters, I've stated that I would explain my theory of Brown's Gas, and show some proofs for my thoughts. Well, here it is.

We have already discussed how, in an electrolyzer, the water was easily split, using electricity for the force and some electrolyte as a catalyst, so that the water molecules split at a low power level.

Eventually, at some time, every single water molecule was split apart, the anions and cations that were then formed turned into mon-atomic atoms H and O. In this process, the electrolyzer stays at the same temperature, because energy (as electricity) is being added at the same rate as it is being absorbed by the endothermic chemical action.

In a 'normal' electrolyzer, these H and O atoms then form into H_2 and O_2 in exothermic reactions. which generates excess heat. Some of our electrical energy input has shown up as heat.

WHAT IF they did not reform? What if a significant number of these atoms did not reform into their di-atomic molecules? What if <u>most</u> of these atoms didn't form di-atomic molecules?
Examining the reaction between the plates, is it possible to cause the atoms to rise off the plates without combining into di-atomic form? (By using various methods detailed later.)

Examining the bond energies. 442.4 Kcal per mole is required to split the water. This is still endothermic electrical energy.

But if we have no, or little, 're-bonding' into di-atomic molecules, then our electrolyzer wouldn't heat up, because there would be no exothermic reaction that would cause excess heat, beyond the agitation of the fluid by the bubbles. This '**lack of heat**' in the electrolyzer is what I noted in my experiments that actually produced Brown's Gas.

There would also be a **significantly larger volume of gas** produced by the electrolyzer, well beyond any reasonable expectation of a 'normal' electrolyzer, because the mon-atomic moles would take up twice the volume that the di-atomic moles for the same weight of water electrolyzed.

More specifically, if two gram-moles of water (36 grams) are electrolyzed, two moles of H_2 and one mole of O_2 are normally generated, which would displace 67.2 liters.

But if two gram-moles of water were electrolyzed and none of it reformed into H_2 and O_2, then it would displace 134.4 liters. The two gram-moles of water would form four moles of atomic hydrogen and two moles of atomic oxygen.

My experiments verify this; not to that efficiency, but much more volume than you could expect by assuming a maximum efficiency to a normal electrolyzer.

Yull Brown publishes information that his generators put out 340 liters for every kWh of power consumed. Calculations from the information provided previously (assuming 2.1 volts across his cells) shows that the maximum possible volume per kW would be 298.50 liters.

Here is the math: 26.8 amps x 2.1 volts = 56.28 watts (watts = amps x volts). If 56.28 watts is continued for an hour, you will have 56.28 watt-hours and 16.8 liters of gas. 1000 watt-hours (1kWh) divided by 56.28 equals 17.7683. 17.7683 times 16.8 liters equals 298.5 liters. Thus I assume Brown's Gas to have significant amounts of mon-atomic H and O.

For another example, let's use the results of an independent test of Brown's Gas by an engineer named Harald Hanisch. Mr. Hanisch was Director of Research and Development of Simmering-Graz-Pauker, a large machine-building and railway-car manufacturer owned by the Austrian government. He couldn't believe that oxygen and hydrogen could be mixed and burned safely and he certainly would not believe that Yull Brown got any 340 liters of gas per kilowatthour.

Mr. Hanisch decided to go to Australia to see for himself. He wanted to test for himself the actual input of electricity and the actual output of gas. During his actual testing, with the water displacement method, he found Yull Brown's machine produced 368 liters per kilowatthour.

Published literature on Brown's Gas says that 1 liter of water would make 1866.6 liters of Brown's Gas. I believe this detail to be right, because normal H_2/O_2 is 933.33 liters of gas per liter of water and Brown's Gas displaces more volume than normal.

Now let's carry our speculation a bit farther. If we assume that we are getting significant amounts of H and O in our torch gasses, what would happen to them when they burn?

If we had all H and all O, our flame wouldn't have to be very hot to 'self propagate' because the flame wouldn't have to be putting all that energy into splitting the H_2 and O_2, before it could burn. So we'd have a 'cold' flame, right? And it is universally noted that Brown's Gas burns with a very low temperature flame.

If we had all H and all O with no H_2 and O_2, and we reduced straight to water. We would go from a greatly expanded gas to liquid, a reduction of 1866:1 , with little of the expansion caused by heat. This would produce quite a vacuum, don't you think? And if our 'flame' was doing this, the reaction would be an 'implosion', right?

And if the H and O went directly into forming water, we'd have (for four moles of H and two moles of O) 442.4 Kcal of available energy, instead of only 115.7 Kcal available from H_2/O_2.

The extra available energy could account for some of the strange effects of Brown's Gas, like sublimating tungsten, which requires temperatures close to those found on the surface of the sun.

'Normal' H_2/O_2 flames can't reach these temperatures.

The special imploding high energy reaction could be tapping unknown effects, explaining some other effects of Brown's Gas, like its ability to make clean laser-like holes in wood, metal and ceramics. As well as the capability of changing temperature when applied to different materials.

When applying Brown's Gas to a material to be heated or welded, the various materials often affect the ratio of O to H, because they contain H and O of their own. Thus Brown's Gas has widely different effects when heating or welding various materials.

The 'implosion' effect of the Brown's Gas torch flame, with its resulting layers of steam, could account for Brown's Gas ability to do welding effects that otherwise would require inert gases or a vacuum environment.

All through Yull Brown's patents and information I see again and again, reference to mon-atomic hydrogen and oxygen.

During a Brown's Gas mon-atomic hydrogen (H) and mon-atomic oxygen (O) flame, we don't have to add any energy because the molecules are already in their simplest and highest energy atomic form. This means that 'perfect' Brown's Gas can have 3.8 times the possible heat energy that an 'ordinary' H_2 and O_2 flame has (442.4 Kcal/115.7 Kcal).

Thus we can get 'plasma' type temperatures and effects as we weld, because the potential energy is there.

We can also get a flame that will heat up two materials to two different temperatures at the same time, while welding them together, because the BG allows the unique effects to take place in a vacuum.

But if the Brown's Gas has so much heat potential, where is the heat when the flame is imploding in open air? The flame seems to only reach the temperature needed by the material it is reacting with. In air, the flame temperature has been

measured at 129°C to 137°C. The same flame reacting with a brick measured 3100°C. And the same flame with tungsten begins to sublimate (turn directly from solid to vapor) the tungsten, indicating a temperature nearly 6000°C. So, to repeat the question; where is the 'heat' when the flame is burning in open air?

Perhaps my further experiments will come up with an answer that I can accept. A conversation with Yull Brown on this subject was not enlightening.

Some scientists believe that atomic hydrogen can spontaneously form in space, apparently from 'nothing'. Is it possible that our simplest atom is somehow tied to an underlying aspect of our universe that is currently invisible to our science? In physics it is known that the elementary particles that make up protons, neutrons and electrons appear and disappear constantly, some having 'life spans' so short as to make viewing them extremely difficult.

I see (from my experiments) at least two possible ways to create over-unity heat by using Brown's Gas. So I suppose the possibility of making heat disappear should not surprise me.

Also, Yull Brown states that the Brown's Gas mixture must contain two parts hydrogen to one part oxygen, within plus or minus 5%. With all of the above information, it is not to hard to figure out why. If the mixture has too many O left over, they will form O_2 and too many H will form H_2. The O2 and H_2 will cause the reaction to skew back to 'normal' and you will have a hot, exploding flame.

Now you know some of my thoughts on why Brown's Gas works. Now I will admit that I could be blowing hot air. But, as any inventor knows, a theory must be advanced based on observed phenomenon before further experiments can be tried. If further experiments verify the theory, then it is possible to develop practical applications. I am waiting most anxiously to hear Yull Brown's theories.

Apparently up till now, Yull Brown has withheld much information. If he doesn't get a chance to distribute his hard won information, all we can do is try to duplicate his work and then give it to the world. Hopefully we can do this in a way that will give Yull Brown credit for the technology and some sort of financial reward for his work.

As I see it at this time, the main trick is to learn how to keep the H and O from recombining, once split by electrolysis. The better we get at this, the more success we will have. Good electrolyzer design is important. Proper materials, electrolyte selection and concentration, and power supply characteristics are vital.

BUILDING A BROWN'S GAS ELECTROLYZER

I have several electrolyzer plans that I've acquired over the years. In the list of components for one was 'A large amount of common sense, sometimes hard to acquire'. I cannot stress enough that these are dangerous experiments. Very rewarding when they succeed but still dangerous. Just take a lot of care and keep safety uppermost in mind.

In any case, it is a good idea to order some sheets of Lexan, at least 1/4 inch thick, to use as blast deflectors for your experiment. Build a frame around the electrolyzer and flashback container and put the Lexan between you and them. Just have your hose coming out of the enclosure. Only put Lexan on the side towards you, so any blast will tend to go the other way. Obviously, outdoors is the place for your initial experiments!

Safety equipment, such as goggles, face shields, protective clothing, etc., can be ordered from the catalog of Industrial Safety Co., 1390 Neubrecht Road, Lima, Ohio, 45801.

The plans presented here will be for a simple Brown's Gas generator. In future books, I will show you how to build a full system with all the options.

Getting the Brown's Gas patents is a good idea. If you just get the later one, it has all the information of the earlier one, and more on an electric arc assist.

Note: Using a glass jar for an electrolyzer is a dangerous procedure. If it explodes, it could be lethal. I used a glass jar in my experiments because I felt the need to see inside to confirm electrolyzer action, but I viewed it from behind a blast shield.

I am still uncertain how various electromagnetic frequencies affect the Brown's Gas. In other words, light and other electromagnetic waves may be affecting my experiments in a transparent container.

For a safer model, build your electrolyzer out of plastic. PVC is a good plastic to use. Transparent PVC can be used. *(see Resources)*

Since different materials absorb hydrogen and oxygen at different rates, thereby their use can change the gas ratio and prevent proper BG gas ratios. In addition to this, the hoses and containers could have different permeability (gas loss) rates. Atomic hydrogen will slip though nearly any material. Atomic oxygen is a much bigger atom than atomic hydrogen but still smaller than diatomic oxygen. So take care in selecting container and hose materials. I have a few recommendations at this time, beyond the compatibility data sheets in the catalogs listed at the end of the next chapter.

When gluing on your end-caps and drilling and tapping your fittings, make very sure to seal well. Any impure gas leaks in or some gas leaks out and you will not have Brown's Gas.

Make sure your joints are properly sealed. Pressure test your electrolyzer under water with at least three times operating pressure. Under water you'll see bubbles if you have any leaks.

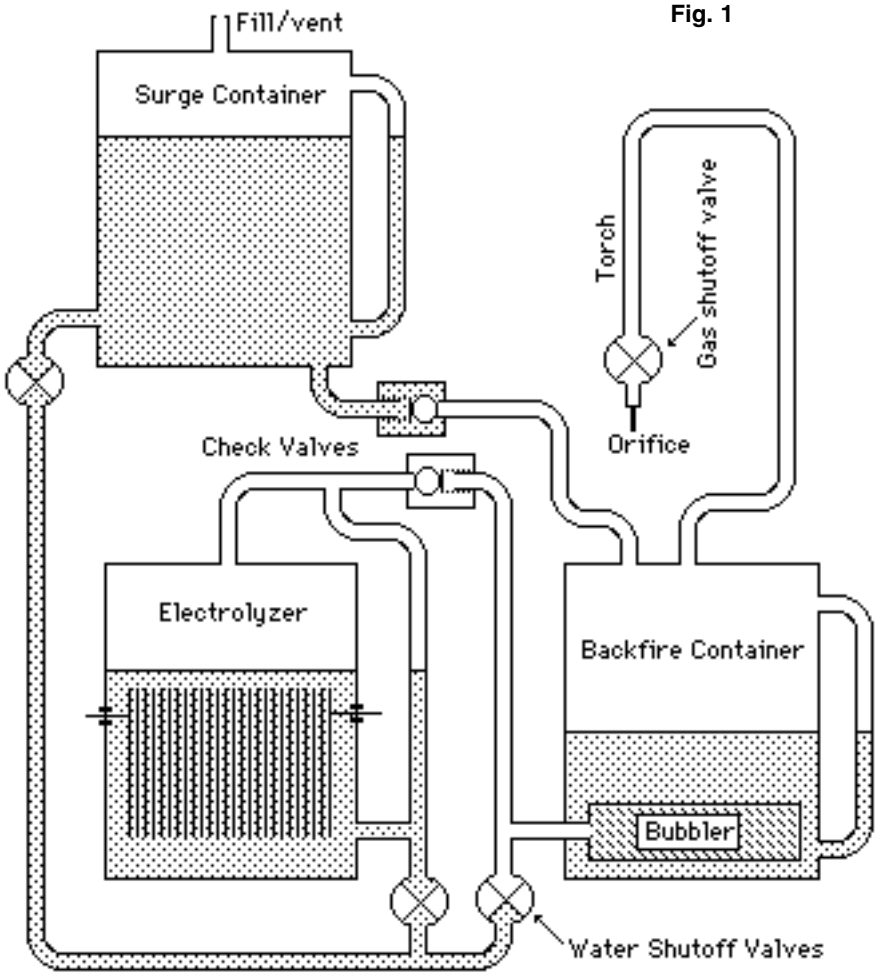
Then, vacuum test your electrolyzer. The electrolyzer should hold a steady vacuum of at least 28 inches of mercury. The vacuum test should run for at least 24 hours.

Smaller diameter containers are better able to withstand pressures and vacuums. I don't recommend over 4 inches diameter for this experiment.

If you use an electrolyzer container that is opaque, you should put a 'sight tube' on the side of it to keep a watch on electrolyte level.

Note that I enter the fresh water under the liquid level. This an attempt to prevent gas leaks, by minimizing fittings above the liquid level.

Fig. 1



The plates should be spaced not less than .125 inches (1/8') apart to prevent capillary action and to allow the gas to escape.

You want as much plate surface area as you can stuff into your electrolyzer. The more surface area, the more efficient your electrolyzer will be.

Leave a bit of space below your plate pack to allow for sediment and to allow for liquid flow. Leave room beside your plate pack for the same reason.

Plate packs are made of 316 stainless steel, separated by plastic washers and held together with plastic machine screws. The positive and negative sets of plates are offset a bit; to allow the individual plate ends (or just a corner) to be bent to touch the next applicable plate. This allows the electricity to reach all the plates.

Electrolyzer Plate Pack

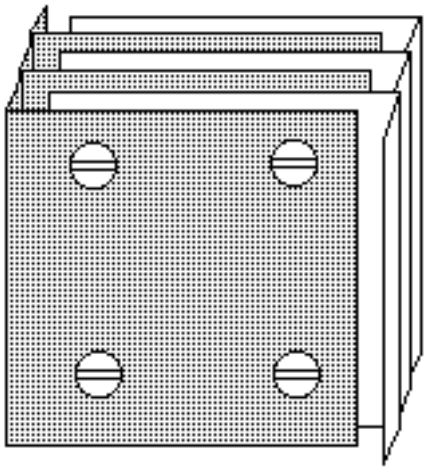


Fig. 2

Pre-bend all the plates before assembly of the plate pack. If all the plates are made identically, then half of them can be reversed to get a perfect lineup of the bolt holes. I drill all the bolt holes at once, with all the plates clamped together, before bending the edges; this assures that all the bolt holes will line up. Use plenty of cutting fluid when drilling stainless steel. Use a drill press and keep your drill bits sharp.

When you bend the plate edges, bend them past 90°, so that as you clamp the plate pack together, they can self adjust their spacing a bit. Remember to get the proper length to the bend. If using 22 gauge sheet, you need the sheet thickness twice (.0312 x 2) and the gap space twice (.125 x 2). Bend on a metal brake for a clean bend.

Note: In my initial experiments I ran steel machine screws through the applicable plates, with steel spacers, to allow the electricity to get to all the appropriate plates. This worked fine, except that I should have used stainless steel machine screws and spacers. Also, the method described above is simpler, less expensive and takes up less room.

Note: You want as much electrolyzer plate area as you can get, but as a rule of thumb, you will be doing all right if you use four square inches of plate surface area (anode) for each amp passing through the electrolyzer. You can increase it to as little as one square inch per amp but you are really pushing the efficiency limits. However much anode you have, you need exactly the same cathode area.

The electrolyzer container must be high enough to allow the 'spray' from the plates to separate from the gas before the gas goes out of the outlet. Otherwise, too much electrolyte will travel to the backfire container. 2 inches above the liquid level is acceptable. Installing a 'splash' shield is a good idea.

I recommend using a check valve in the hose from the electrolyzer to the backfire container. This will prevent the electrolyzer from flooding with water from the backfire container if there is an explosion in the backfire container or an implosion in the electrolyzer.

Backfire prevention is a critical safety need in electrolyzer design, the last (and usually only) line of defense against an explosion in the electrolyzer.

Check valves ordinarily don't work with hydrogen because they don't close quickly enough. A hydrogen flame can reach speeds over three times faster than acetylene and six times faster than propane.

Ordinary check valves are totally useless in an implosion, they simply allow the gas to flow at a higher rate. At the very least, use a bubbler type backfire container, to protect your electrolyzer.

The backfire container can be made out of steel, to help it withstand explosive backfire. You can have an optional 'sight tube' on the side of it, to see the liquid level.

A bubbler can be built from a pipe that has been drilled with many small holes and then wrapped with several layers of nylon cloth, so that all the gas has to find its way through the layers of cloth. Nylon is compatible with lye.

DO NOT USE ALUMINUM ANYWHERE IN THIS ELECTROLYZER SYSTEM! Aluminum reacts violently with sodium and potassium hydroxide.

Most small welding electrolyzers work on about 1 to 2 psig pressure. My design works on any pressure you choose, by varying the orifice of your torch and the power applied to your electrolyzer. If you get too many backfires, you could use a smaller torch orifice or use more power by increasing the capacitance of your power supply.

You must take extra special care to prevent an explosion by over-pressure. You could provide an over-pressure relief system consisting of a check valve in a hose, from the backfire container, that vents through a raised water surge container. This would prevent atmospheric gasses from mixing with your Brown's Gas, while providing a very reliable pressure relief.

You can increase the over-pressure relief system pressure by raising the surge container. Each foot of rise will increase the venting pressure by .43 psig. Also, check valves require some pressure to allow the gas to vent, this increases your vent pressure too. Higher pressure gives the torch gasses a greater velocity, thus helping to prevent backfire.

Higher pressure will also cause more gas to be used, thus you would need to create more gas, thus need to use more electricity. Amps make gas.

I use about 1/4 inch inside diameter hoses for all hoses. This seems to be an easy size to work with and allows fluid flow with minimum restriction with this size of unit.

I recommend the use of Luer type fittings for your torch and hypodermic needles for your torch tips. Hypodermic needles should be available at your local drugstore. Get the smallest sizes they have.

You'll find, when you research other electrolytic water torches, that this arrangement is quite common. The needles are cut off at 1/2 inch and ground flat on a grinder. Use a syringe to make water pressure through the needle while grinding to cool the tip and to help prevent a 'lip' from forming over the opening.

Use of Luer needle type adjustment valve will help the operation of your electrolyzer, in terms of easy shutoff or torch adjustment while welding.

You can make a quite acceptable torch out of various Luer fittings and some metal or plastic tubing.

BUILDING A POWER SUPPLY FOR A BROWN'S GAS ELECTROLYZER

In my previous experiments I have found that Brown's Gas is sensitive to high voltage. I learned that Brown's Gas can be produced by low voltage, the lower the better.

The Brown's Gas electrolyzer doesn't need high voltage, so we will keep to the minimum voltage possible. We also want a particular type of pulsed current flow. We want maximum efficiency to prevent heating of the electrolyzer and to use the minimum power to produce the maximum gas. These requirements are not as easy to fill as it might seem.

I have developed several power supply designs that will meet the requirements of a Brown's Gas electrolyzer. I'll expand on the other types of power supplies in future books. Here I've chosen one for you.

I call this one a 'Capacitive Power Supply'. No transformer is needed. I've described this power supply previously. This is the simplest power supply that I've developed that has demonstrated it's ability to make Brown's Gas.

As long as you keep the electrolyzer plates covered with electrolyte, this system will work fine. When the plates are covered with electrolyte solution, the solution does not allow the voltage to build up on the plates because the solution allows the electrical current to 'flow' to the opposing plate. If the plates become uncovered, they will cause the Brown's Gas to implode as the voltage goes up.

My capacitive power supply will always supply the lowest voltage necessary to push the amperage you've chosen by sizing your capacitors.

You can add capacitance 'on the fly' by switching in more capacitance. In my schematic I show adding capacitance C2 with switch S2.

Amperage is measured using a 0-30 amp gauge. This gauge is optional but I've found it very useful. If you build an electrolyzer that uses more than 30 amps, be sure to use a larger ammeter.

I use an on-off-on DPDT switch (S3) to shut off the electrolyzer and to allow plate voltage reversal to prevent too much garbage buildup on either plate.

Note that I route the wires through connectors below the liquid level of the electrolyzer. This is to prevent the magnetic fields of the wires from interfering with the BG. Also because it is easier to seal liquids than gas, so the chances of a leak occurring that would contaminate or change the stoichiometric ratio is reduced.

I simply use a stainless steel machine bolt through the plastic container, with rubber washers on either side. I use a double nut system on the outside threads to hold the wire terminal from S3.

S1 is a DPDT switch. This is the switch you turn on and off to control the power to the electrolyzer. Note that it is located after the capacitors, to keep you from being shocked from electricity stored in the capacitors, if you are disconnecting the electrolyzer.

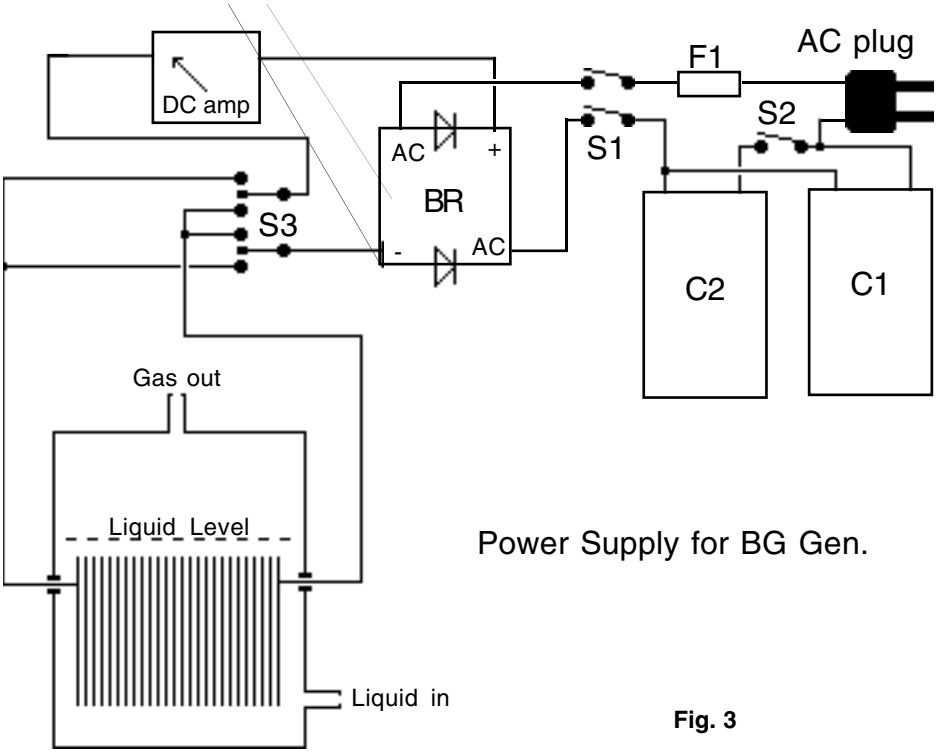
S2 and C2 are optional, to add additional capacitance as you experiment. For example; if you wish to use a larger torch orifice.

Size the capacitors to handle your amperage. For example, 24 uf will give you about one amp through the plates.

For operation on 120 VAC, use only capacitors that can handle 300 volts and are rated for AC operation. Do not use electrolytic capacitors!

Size your fuse for just above the amperage capability of your least component. Use a slow blow fuse or you will pop it during the initial surge to fill the capacitors.

Use a heat sink on your rectifier. Oversize the bridge rectifier. For example, if you intend to operate at 30 amps, then get a 50 amp bridge



Power Supply for BG Gen.

Fig. 3

rectifier. Or make one from single rectifiers.

For experimentation, the automatic controls are optional, therefore I have not included them in this book. I will include them and much more information on using Brown's Gas in actual welding operation, in future books of this Brown's Gas series. The purpose of this book is to allow people to acquire a working knowledge of Brown's Gas and allow them to produce Brown's Gas for experimentation.

In this design, manual control can be accomplished with careful adjustment of power supplied to the electrolyzer, orifice size and height of the surge container. I have tried to give you the minimum system that would produce Brown's Gas safely. This design will power a very small torch or the gas can be used for various 'implosion' experiments.

Another advantage in using a very small torch tip is that a small tip is less likely to backfire. But the smallest drop of moisture in the gas will cause your flame to sputter or extinguish as the drop momentarily blocks your torch orifice.

Note: There are several small 'jewelry type' welding electrolyzers on the market. I have yet to find a commercial one that actually produces Brown's Gas. All of them produce oxygen and hydrogen in an electrolyzer and don't separate the gasses BUT the resulting vapor has only the properties of H_2 and O_2, not the properties of Brown's Gas.

If you want to know if a particular electrolyzer is producing Brown's Gas, ask them if they've had a temperature analysis done on the flame temperature as it is burning in open air. If the flame temperature (without fluxing) is higher than 280°F, then it is not Brown's Gas.

Also, you can test the output volume, according to the formulas I've given you in this book, to determine if there is the 'extra' volume that would indicate Brown's Gas.

Note: I do not believe that the simple pulsing action of a normal bridge rectifier is sufficient to produce much Brown's Gas. My power supply designs add a quick 'peak pulse' to the wave form, that I believe enhances the effect that allows more of the gas to be Brown's Gas instead of normal H_2/O_2.

Don't get me wrong, there is nothing wrong with using the gas produced by these commercial electrolyzers for welding or whatever; just be aware that you cannot expect Brown's Gas effects **because the gas is not Brown's Gas**. All commercial electrolyzers (of which I am aware) produce ordinary H_2 and O_2 gas and that gas is explosive!

There are several electrolyzer-water torches on the market, for jewelry making and electronics type work. For those people who want to buy components like hoses, torch and tips, these company's products are an excellent, (though expensive), source for water torch components. I haven't tried, but it may be possible to convert one of these water torches into a Brown's Gas water torch. *(see Resources)*

OPERATING A BROWN'S GAS ELECTROLYZER

If you allow uncontrolled (or too much) amperage, the fluid between the plates will act as the 'resistor' and will not create BG because the excess heat will cause the H and O to form H_2/O_2. You will know this is happening because your voltage across the plates will rise above 2.1 volts. I believe that anything

above 2.2 volts won't make much Brown's Gas.

Of equal importance is that the gas pressure not 'pulse', because between pulses you could get a backfire. You can pulse the electricity to the plates, as that won't cause the kind of pulse I'm talking about. Your water filled backfire container is more likely to cause gas pulsing because the bubbles may come in pulses, from the bubbler. Be sure to install a bubbler that makes lots of little bubbles and disperses the little bubbles throughout the water.

If the pressure in the backfire container rises to the point that gas is venting through the surge container, the pulses will cause pulsing of the gas in your torch, and this could lead to backfire.

I can only assume at this point that O and H would have similar absorption rates (in water) to O_2 and H_2 respectively. This dissimilar absorption upsets the exact 1:2 ratio needed to have Brown's Gas. I recommend allowing an electrolyzer to operate for a bit on first startup (before igniting the gas) to allow the water in the electrolyzer to saturate and then the further generation of gas should be Brown's Gas. This absorption effect and the varying permeability effect of the different materials the electrolyzer is made of will affect the ratio of O to H. Hopefully not beyond the 5% limit.

When first starting up, every time after the electrolyzer has been allowed to sit and lose pressure, you will have to purge the electrolyzer and the backfire container of any impure gasses that may have contaminated them.

In my experience, simply operating the electrolyzer for a period of time WILL NOT reliably purge the impure gasses out of the electrolyzer.

I have tried various ways; for example, purging by flooding with water. The problem was that my hoses got full of liquid and were difficult to dry for proper torch operation.

After lots of thought, I decided to purge with vacuum, and I've found it to be best. You buy a hand operated vacuum pump from your local automotive supply store, or from J. C. Whitney catalog or you use a powered vacuum pump and you SUCK those impure gasses out of there.

Once the containers are under vacuum, turn on the power to the electrolyzer and you're in business. Shut off the torch valve, allow the gas to vent through the surge container while you disconnect the vacuum pump and put on your orifice of choice.

Note: You put a female Luer fitting on your vacuum pump to allow it to fit on the end of your torch. You will have to release the vacuum from your pump before you will be able to take it off the torch. Shut off the torch valve before releasing the vacuum pump's vacuum.

Note: Another peculiar thing I've noticed while making Brown's Gas is that it is difficult to store. If BG is allowed to sit in a container, it will eventually turn back into ordinary H_2 and O_2, thus leaving the container in a partial vacuum. This was in transparent containers, so it is possible that something like light was enough to cause the molecular shift.

Be absolutely sure to use nothing but de-ionized water in your electrolyzer, and be sure that the de-ionized water doesn't contact air directly. De-ionized water is much cleaner than distilled water. Keep it in a sealed container as much as possible. With the electrolyzer surge container, have the air come into it through a cigarette filter.

In spite of everything, you will get impurities in your water and therefore electrolyzer. And you will, over a period of time, get electro-deposition of metal from plate to plate and you will get oxidation on the positive plates. This is why I have the (optional) plate reversal switch S3. Every so often, somewhere around 50 hours of operation or once a week, I switch the polarity of the plates. This shakes off impurities and allows them to settle to the bottom of the electrolyzer.

You refill the electrolyzer and the backfire container as they need it. In the electrolyzer, just watch the electrolyte level and keep it about 1/4 (.25') inch above the plates. In the backfire container, be sure to leave enough room to allow gas/liquid separation before the gas enters the torch hose (about 2 inches, a filter or baffle is a good idea too). Fill by putting the system under vacuum and opening the refill valves slowly. It won't need much, remember how much gas we can produce from a little water?

If the backfire container gets too full, due to water slipping by the check valve when the over-pressure system is operating, then open the water valve on the bottom of the backfire container when the backfire container has pressure in it (with the torch valve closed) and the water will leave the bottom of

the container and travel to the surge container.

I use a syringe to keep the needles (torch tips) clean. Clean after every use with ordinary clean water. Otherwise I note that some lye tends to build up in them. Suck and push dry air through them a few times to dry them after cleaning with fresh water.

I use a Luer shutoff valve to shut off gas flow during tip changes and when torch is not immediately in use. Be sure to build a sturdy stand to hold the torch if you intend to put it down while still lit.

When you start up a BG generator, you should allow it to operate for several minutes to allow the various materials to become saturated with hydrogen and oxygen; thereafter all the gas generated should be BG. This is when you shut off the power and apply your vacuum, then start up the power to fill your system with fresh BG.

I believe it is important to get the gas away from the plates as quickly as possible because the sooner you can mix the mon-atomic hydrogen and oxygen, the more stable the mixture will be. So I keep the fluid level close above the top of the plates.

My experiments have shown that Brown's Gas can be reasonably stable if certain conditions are maintained. One of those conditions is NOT to separate the oxygen and hydrogen at any time. Another is to keep the gas as cool as possible, I recommend not over 22°C (71°F). Another is to prevent high voltage (preferably not over 2.2 volts) from contacting the gas.

These factors and others that I haven't yet identified can cause the Brown's Gas to shift from its mon-atomic state to its di-atomic state. If this molecular shift is too quick, the heat released is enough to implode or explode the mixture, depending on the composition of the mixture at the time of reaction. The molecular change (from mon-atomic to di-atomic) also makes that amount of heat unavailable to the flame.

As a good rule of thumb. If your electrolyzer stays fairly cool during heavy power, you are likely making Brown's Gas. I have discovered that most heat that is generated in an electrolyzer comes from the manufacture of di-atomic hydrogen and oxygen. Brown's Gas generation is purely an endothermic reaction. You are putting electrical energy in and you should be getting no other energy out. This makes Brown's Gas generators extremely efficient.

An 'ordinary' H_2 and O_2 flame produces three times less radiant energy than a hydrocarbon flame (methane, propane, etc.). With Brown's Gas, there is very little radiant energy because the flame doesn't need it to propagate itself. This makes Brown's Gas easier and safer to work with.

Ordinary hydrogen (H_2) is a very small molecule. H is even smaller and escapes most containers easily by bouncing between the molecules of the container.

NOTE: Hydrogen escaping through the walls of pipelines causes the metal to eventually become brittle. Hydrogen storage is safely done with 'hydrides'. Hydrides are metals that absorb hydrogen with a weak molecular bond, so that it can't escape. Getting the hydrogen back out of hydride storage involves heating the hydride.

H_2 escapes a hydrogen balloon at the rate of about 10% per day.

Brown's Gas hydrogen (H) is even smaller than H_2. (H) can enter most materials easily. I believe this may account for the interesting 'material oriented' temperature of a Brown's Gas flame.

More information: You can look forward to further books in the 'Brown's Gas' series. They will include information on:

(1) The 'long series cell' concept of Yull Brown (and other inventors). This concept allows the electrolyzers to produce huge amounts of Brown's Gas when the electrolyzer is connected directly to common household power with no transformer in the unit. This makes for a lightweight, efficient and inexpensive water torch.

(2) Collected uses of Brown's Gas. Details on various demonstrations that have been recorded by Yull Brown and persons using his electrolyzers.

(3) Over-unity energy production using BG technology. Because of the unique effects of Brown's Gas, it is possible to get more energy out of the system than you put in. This is not perpetual motion, we are just tapping energy sources that have previously been unavailable.

(4) Much miscellaneous information, such as how to make your own lye, and how to build different power supply designs. The general idea is to be able to build efficient, automatic, simple, inexpensive and powerful Brown's Gas water torch designs. And to be

able to operate your Brown's Gas torches safely.

This page is mostly empty because the resources have been moved to the Eagle-Research website.

We did this because the supplier information changes from time to time, and we can update the information on the website.

This page is mostly empty because the resources have been moved to the Eagle-Research website.

We did this because the supplier information changes from time to time, and we can update the information on the website.

WHO IS GEORGE WISEMAN

George Wiseman is the founder and president of Eagle-Research, a non-profit organization that develops and distributes energy-saving solutions. He is multi-talented and multi-degreed, but singular in his mission: to promote self-sufficiency at the individual level by discovering and sharing the best, all-around, practical solutions.

George attributes his self-reliance, resourcefulness and commitment to our natural environment, to his rural roots. “Dad didn’t believe in having any equipment on the place (hobby farms in Montana, Oregon, Alaska and finally a ranch in British Columbia) that we couldn’t fix ourselves. We had running water if we ran and got it. And electricity was something that came in batteries”. His farm-grown, western cowboy philosophy combine well with his inventor persona to create a world-class visionary. He takes the hand-up rather than the hand-out approach to everything.

Since 1984, George has been making his living as an inventor and author. His fuel-savers have gained him a worldwide following of satisfied consumers who eagerly pursue his work for new offerings. George continues to impress his customers, peers and competition with practical innovations that can be successfully home-built. His latest product, the ERxxxx WaterTorch, is making great waves in dozens of industries around the globe.

As much as anything, it’s his commitment to patent-free technology development that has earned George Wiseman a champion reputation. Openly sharing research findings benefits everyone by constantly elevating the standards of viable energy solutions.

George’s work has been featured on radio and in newspapers around North America and at many ‘alternative’ energy gatherings including the International Tesla Society Symposiums and Exotic Research Conferences.

He lives with his bride, Tenaj, and their brood of cats, in a lush valley of the Rocky Mountains.

CASTLE PROJECT

Eagle-Research (George Wiseman) in cooperation with Being Unlimited (Tenaj DaCosta Wiseman) are in the initial stages of creating their ultimate dream. They envision a world-renowned educational energy centre designed to find, develop and harness the unique genius inside each of us.

The centre will be open to all sorts of creative-thinkers in their respective fields: inventors; writers; healing arts practitioners; feng shui specialists; architects; illustrators; horticulturalists; fitness experts…

Individuals wishing to participate in the project may access the required reading list, that will be updated from time-to-time, on the Eagle-Research website: (www.eagle-research.com)

Comments and/or contributions are invited from anyone who is committed to cultivating dream seeds. Nay-sayers are better not to waste their time. Negative input will be wholeheartedly disregarded.

❝ Too low they build, who build beneath the stars.❞
- Edward Young -

CONTRIBUTIONS

We appreciate your contributions. Your input helps us further develop these technologies into more and better practical solutions.

Remember though, we are a non-profit organization putting our time and money primarily toward research. There is seldom anyone in the office to answer the phone. For budget reasons, we usually do not return long-distance calls unless calling collect. We prefer to have customers contact us by email, FAX or letter.

CUSTOMER SERVICE

Orders are filled first. Mail is answered when possible. Send orders and technical questions in separate correspondence or your order may be delayed.

If your calculations are incorrect or there is missing information and we cannot reach you by email, we will have to wait until *you contact us* before we can process your order.

SEMINARS & CONFERENCES

George Wiseman is available for a limited number of speaking engagements each year. For consideration of your next event, FAX details to Eagle-Research, at least three months in advance.

GUARANTEE

All Eagle-Research products are sold with a money back guarantee. If you are dissatisfied for any reason, return the product(s) within 60 days of receipt for a full refund of the product(s) price.