EEVC NEWSLETTER

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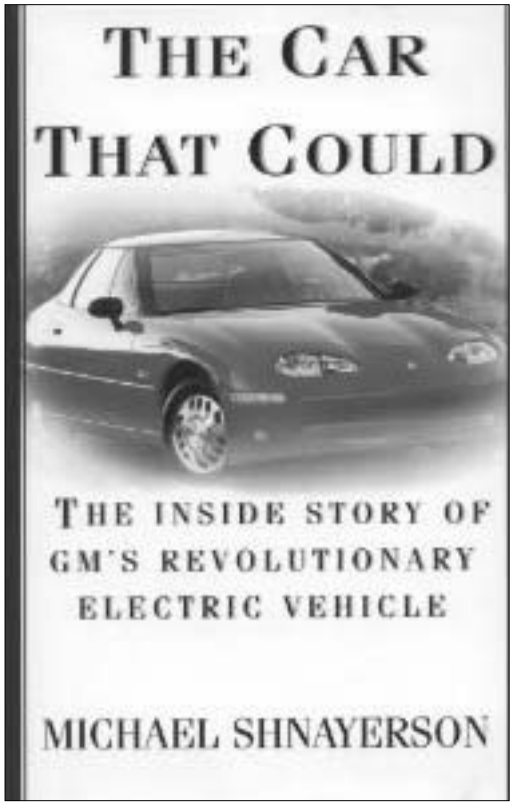
BEFORE THE EV-1: CAME THE IMPACT
"The Car That Could" authored by Michael Shnayerson
Part IV review by Oliver H. Perry



Ken Baker was the chief engineer from GM placed in charge of moving the prototype Impact electric car from its initial concept stage, one of a kind vehicle, to a proof of concept car ready for the assembly line as the first mass produced electric vehicle in the world. As previously mentioned Baker was hoping to convince the GM directors that a mass-produced electric car was feasible even while GM was losing money and closing down manufacturing facilities. On the one hand the California mandate for cleaner emissions favored Baker's effort but the US economy and climate within GM was against him. Baker resorted to a "fast built" assembly line prototype Impact in an effort to convince his superiors of the viability of a profitable EV before they had a chance to cut a losing program.

On May 12, 1992 Baker's team unveiled a fantastic vehicle. However Baker asked for thirty more days in order to tweak the Impact with further improvements. Since all of the easy improvements had been accomplished to the point where most felt the project was ready to be advanced, Baker's tweaking would prove to be difficult and stressful to say the least. The story continues…

Hollow Victory

Quote from the chapter titled Hollow Victory: "In the thirty-day win period, tensions sharpened and tempers snapped. The glow of camaraderie had given way in many cases to resentment and confusion. It wasn't unusual for one's immediate supervisor to look over one's shoulder and say, do a fender this way, only to have that superior 's superior an hour later come by and say, do it that way."

Aside from the tensions on the work floor Baker's main concern related to finances. He knew that regardless of how many changes he

made in the Impact design that the best he could do would be to present a vehicle that would dip $500 million into the hole before it would begin to make a profit. He had to find ways to make the car more desirable in the marketplace and less expensive to build.

The best he could do, Baker figured, was to reduce his hoped-for production figure of 20.000 cars per year down to 10,000 cars. It was true that the more cars produced the cheaper one could make the production tools, but overproducing cars that did not sell could easily offset these gains. Baker's projected selling price would be $35,000 per car, half to cover cost of parts and half to cover R&D costs. Getting to profitability would mean using the Impact as a two-seated sports lead car. A profitable larger four-seated EV would have to be offered after the EV market was established. But a larger car would require larger batteries if its range was to match that of the Impact. But Baker saw no immediate way to make a larger car profitable at the same price as the Impact.

John Dabels, the marketing manager of the project, was quoted as saying that the Impact program was committed to losing a billion dollars with a car that nobody would want to pay such a high price for.

John Dabels, and other progressives, saw the auto industry mired in a manufacturing mind set that needed to change. Electric cars seemed to be more like computers and the whole approach to producing them had to be revolutionized. GM was a company committed to huge capital expenditures on bringing new "made in steel" models to market with costly three year plans to design them. These vehicles needed thousands of sales to become profitable. Dabels thought that the Impact project needed to be geared toward lower volume and more flexible production models with less overhead. He questioned the whole approach that Baker was implementing to usher in the Impact program.

Baker did accept that after the 30 day tweaking process that the Impact's business case still remained in question. However, at the end of thirty days the team had succeeded in coming in slightly under the 1319.8 Kg (about 3900 Lb) mass target. The price cost was within 3.7% of its target. Baker hoped that these accomplishments would impress top management sufficiently to let the Impact project advance.

A birthday cake with one candle was presented to the Impact team to celebrate graduation from Phase Zero to Phase One. Baker told his engineers that the Impact was not only the best electric car in the world but perhaps the best car in the history of GM. He was ready to showcase the car before GM management and ask for a lion's share of investment. He predicted that within a year's time the first Impact would roll off the assembly line in Lansing, Michigan.

Wait a Minute! Wait maybe a few months! We ain't got money!

The directors responsible for advancing or killing GM programs had a mixed review of the Impact program. A number on the panel felt that the Impact's achievement was extraordinary. Bleak as the prospect was for producing a profit, some thought that the Impact could make up for its losses in raising the GM image. Maybe the Impact image could actually raise GM gas car sales. However the Impact program was clearly not a go across the board.

On August 11,1992, Bill Hoglund, the chief financial officer of the GM management committee, asked Baker if he expected GM to take money from a profitable division like Buick and invest in a losing venture like the Impact. The implication was that GM, running short of money, had a limit as to the number of projects they could support. Most of the management bosses seemed to favor supporting the programs that were making money.

Come up with some options

As a result of the management committee's review of the Impact project Baker was told to prepare three or four options for the next steps, from full speed ahead to a full stop. He had until October to come up with these choices.

Immediately Baker's financial advisors began to investigate possible financial options that might make the Impact program more plausible to cost conscious directors. But everywhere they looked they found red ink. Due to some strange features in the way mammoth companies like GM operate, the

Impact program was committed to contracts within GM-owned facilities that could not be broken. The Impact division had forged ahead and leased space sufficient for large volumes of Impact production. This lease had to be honored in the budget even if the production number of Impacts were to be cut. The Impact division also had earlier signed a deal with Delco Remy for 100,000 batteries. So if they cut the Impact to 35,000 vehicles they still had to purchase the 100,000 batteries. (Union contracts were also factors beyond Baker's control.) The more Impact financiers looked at the numbers it appeared that the best approach for the Impact program was to go into EV components production, not car production. Baker began to pass the word, to the GM owned and contracted companies authorized to develop components for the Impact, to begin soliciting clients among GM's competitors. Told for several years to keep their programs a secret, the heads of these companies became confused. Why the sudden change of direction? With orders like this floating around GM everyone involved in the Impact program began to suspect the worst.

In the months before the October ultimatum, which would finally decide for or against moving the Impact from a prototype to a Phase One production car, Baker's team continued to produce more proof of concept cars. Cars were needed for crash tests. Cars were needed for test driving. Cars were needed for assembly practice to make sure all parts really fit together. Only the cars needed for test driving were completed vehicles.

At the same time the assembly line in Lansing was being made ready for assembly line production. If the green light was given in October then the Lansing facility would be all set up to produce the first 50 prototype build Impacts (the first factory-made Impacts).

The Electric Vehicle Cannot Exist Without Government Help

Ken Baker, faced with the reality that the cost of producing the Impact was more than the marketplace could bear, began considering a strategy he'd scoffed at a year or more before: going hat-in-hand to utilities and lawmakers for EV subsidies and incentives. The idea made him wince. But, knowing the Impact program had little chance of being approved in GM, he did what a GM manager never did: swallowed his pride and headed for the California Public Utilities Commission and on to Washington D.C.

Within a few days Baker secured an agreement in principle from the California utility heads. They would offer EV owners lower electric rates and would themselves purchase 5000 Impacts over several years. This agreement theoretically lowered the Impact's purchase price by $2000.

In Washington Congress had agreed to pass an omnibus National Energy Act which would result in a tax savings of about $700 in real cash to an EV buyer. GM's lobbyists were pushing for it but Baker felt he had to plead the case for himself. Unfortunately government help had to be made available to all of the big three automakers. All three had to agree to the terms and all three had to present a unified financial plan. If government taxpayer assistance would not make a significant dent in the cost of electric car production then legislators were not in favor of passing any kind of incentive program.

Baker was not able to present solid Impact cost figures to the legislator aids assigned to review lobbyist proposals because GM's chief financial lobbyist Jean Crocker forbade him to divulge that information. Chrysler and Ford representatives presented costs much higher than Baker had for the Impact. The results seemed in inevitable. But, surprise, surprise, surprise! October 8th 1992 Congress passed a 10% credit on the purchase of an EV and president BUSH (yes I said BUSH) was expected to sign it.

The October 12, 1992 GM Management Committee Meeting

The first date in a series of delayed dates for deciding the Impact future arrived October 12, 1992. At the management meeting Baker presented four options.

Plan A: Continue the Impact Program beginning with a two door money loser followed by a larger four door version that would sop up the losses. With the government incentive about to be passed the future for electric cars looked bright. Did General Motors want to give up its lead in electric car development to Chrysler, Ford, and Japan?

Hopefully not.

Plan B: Delay production of the Impact for two years. Trim the platform to a small band of engineers who could turn out 50 to 100 hand built cars per year and at the same time tool up to sell EV components.

Plan C: Build no cars but keep ahead of the curve by refining the Impact's existing drive train so that GM could sell EV components if the market developed.

Plan D: Shut down the whole program and forget EVs until forced to build them by environmental regulators.

Several pro-EV Impact program GM managers were present on the committee at the October meeting. Bob Stempel advocated Plan A. However Jack Smith, the newly appointed president and chief operating officer who had replaced Stempel as head, felt that GM could not afford Plan A. The decision for the Impact future was temporarily postponed. The next day Stempel was rushed to the hospital in an ambulance, rumored to be suffering with acute anxiety. Further rumors were that GM was so deep in the red that the whole company was about to go under.

Within a few days the management committee resumed discussion regarding the Impact's poor business case. It was ironic that before they decided the fate of the Impact program they had a lengthy discussion on how GM could develop better engines for improving emissions and fuel economy. In the end the committee felt that advocating Plan B was the best they could do. The production staff would be drastically reduced but the 50 hand built Impacts would be carried through.

Determined to cut financial losses the committee had lost faith in the certainty of California mandate looming in front of them. In their minds the two door Impact as a sports car would not reach a wide enough market to satisfy CARB's escalating EV demands. It was better to pull back and hope the mandate would disappear. Due to the staggering amount of financial losses that GM had suffered the committee members had lost their right to make their own decisions as they had in the past. They would recommend plan B to the GM board.

The decision was not a happy one. Three of the committee members hoped that the GM board would reverse their decision when it met in early November. Baker was told that he had one more month to continue advancing the Impact program and hope for a reversal.

A month later Ken Baker would be provided a final chance to make a pitch to the GM board in their upcoming November meeting in Washington. He could reasonably advocate keeping the committee's choice of Plan since he had the management committee's recommendation for that. But afterward Baker might witness the GM board rejecting plan B and ditching the whole program altogether. The author of *The Car That Could*, Michael Shnayerson, relates that at this point in time Baker began preparing what he considered to be the speech of his life.

Complexities and a too-heavy GM board agenda in November allowed Baker to once again postpone the inevitable. Jack Smith allowed Baker to plan on making his address to the board in December. By then Baker thought he could produce a speech so powerful that it would change even the darkest of doubters.

More negative events however would come before the December meeting. Bob Stempel was forced to resign from the board. All of his EV management team were also swept away with him. Steeple's Impact gang was gone along with any hope of reversing the demise of the Impact. Although Smith and Hoglund, several of the younger and newer GM leaders, did not want to ax the Impact, they couldn't see a way to fund it.

As a consequence of the increasingly bleak situation Baker began to consider another idea that he had previously thought might work as a last resort. If GM would not bring an EV into the market by itself, how about introducing Team USA, joining with Ford and Chrysler in a joint EV program to beat the Japanese to the EV market? Maybe a joint effort with Ford and Chrysler could help keep the Impact alive.

Soon Baker was on his way to Ford and Chrysler with the pitch that a three-in-one, Team USA, electric car program was the way to deal with the California mandate. Securing a tentative agreement with Ford and Chrysler representatives Baker approached several key members of the board of GM, including Jack Smith, to test them out. They liked the idea of

Team USA. As a result, Baker's new speech to the GM December Board Meeting, they agreed, should result in Baker shifting his focus from preserving the Impact program alone to supporting Team USA. Hopefully by joining with Ford and Chrysler aspects of the Impact program might survive.

The day of Baker's long hoped for speech, now modified to stress Team USA, finally arrived. The day of reckoning had come. Ironically his presentation would be delivered December 7, 1992…Pearl Harbor Day… in the GM building on 5th Ave, New York City.

It was indeed Pearl Harbor Day. While Baker was making his speech in the safe harbor of GM's lavish New York boardroom, an unexpected article appeared in the Wall Street Journal. The article dropped a bomb on Team USA.

to be continued…

NEWS UPDATE

Nissan Leaf 2011 World Car of the Year

The Nissan Leaf was named the 2011 World Car of The Year at the New York Auto Show in April, coming in ahead of the BMW 5-Series and the Audi A8.

And a faster version

Also at the New York show, Nissan debuted its Nissan Leaf NISMO RC racer. The car sports full carbon fiber bodywork and powertrain with a lithium-ion battery similar to the street-ready Nissan Leaf. The two-door NISMO RC was engineered by the design team behind the Super GT and FIA GT1 race teams, while its three-piece frame rides lower and 40 percent lighter than its EV sedan namesake at 2068 lbs, or 938 kg.

The battery pack, electric motor and inverter are connected to the Leaf NISMO's rear wheels instead of the sedan's front-wheel drive, while utilizing a double-wishbone suspension sitting on 18-inch 6-spoke wheels and Bridgestone racing tires

The lithium-ion battery is comprised of 48 compact modules and a high-response 80kw AC synchronous motor that generates 107 horsepower and 207 ft lbs of torque.

The racing EV can be charged up to 80 percent of capacity in 30 minutes using the quick charging port inside its rear cowl, while on the track it accelerates from 0 to 62 mph in 6.85 seconds and a top speed of 93 miles per hour, and the Leaf NISMO is projected to have a 20-minute racing time.

And a racy hybrid Jag

Jaguar Motors, apparently wanting to compete with BMW in the ultra high cost market, announced at the New York show that it would produce 250 street-legal versions of its C-X75 hybrid supercar, at a price between $1.1 million and $1.5 million. The car will have a carbon-composite monocoque body and an electric motor in each wheel for a top speed of 205 mph and an all-electric range of 31 miles (not at 205 mph).

1000 miles between fill-ups

General Motors has released figures showing that the average Chevy Volt owner has been getting a range of 1000 miles per fillup. This may seem like a lot, but if the car is charged every night

and never driven very far at a time, it could doubtless go farther. Yet still — 1000 miles on a fillup would make a good advertising slogan.

Solar Impulse plans first international flight

The Solar Impulse team has selected Brussels as its first international destination. The airplane will be displayed in the European capital from May 23 to 29, 2011 and will then attempt to fly on to Paris-Le Bourget, where it is eagerly awaited as the special guest of the 49th International Paris Air Show from June 20 to 26, 2011.

U.S. wind industry continues growth

The American Wind Energy Association has announced that America's wind power industry grew by 15% in 2010 and provided 26% of all new electric generating capacity in the United States. With the 5116 MW added last year, U.S. wind installations now stand at 40,181 MW, enough to supply electricity for over 10 million American homes.

China worries EV makers with rules

A story by AP business writer Joe McDonald dated April 20 reports that non-Chinese EV manufacturers are concerned that the Chinese government, in an effort to help it build what it hopes will be a world-leading EV industry, may soon begin pressing foreign makers to turn over their technology to the local companies with which they are required to partner. "Beijing already requires that for a foreign manufacturer to produce an electric car in China, its local joint venture must own the technology for one of the three "core components" — the battery, the motor or the power-management system," according to the story.

From *The Wall Street Journal*: GM Revs Up Its Lobbying

Monday May 2nd 2011, by Sharon Terlep and Josh Mitchell

"Detroit—General Motors Co. has stepped up its lobbying in Washington in recent months, federal records show, as Detroit's two (Chrysler and GM) rescued auto makers unwind their ties to the government and return to pursuing their own interests — which sometimes are at odds with the Obama administration.

"GM spent nearly $3.6 million on lobbying in the first quarter of 2011, more than twice what it spent in the three months after it emerged from a restructuring in bankruptcy court in 2009, according to disclosure forms.

"In recent months, GM, still partly owned by the American taxpayers, has lobbied to shape proposed emissions and fuel mileage standards, influence implementation of a new financial overhaul law, and lift limits on its executive pay.

"Lately the company has joined other automakers in urging the White House to back off a proposal that could require automakers' fleets to get average 62 miles a gallon by 2025, and to instead adopt less ambitious standards.

"Meanwhile, GM's chief executive has traveled to Washington to argue against the executive pay caps imposed on it by President Barack Obama.

"For GM the shift is another step toward distancing itself from the stigma of being "Government Motors." A spokesperson said an effective lobbying shop is critical to GM's ability to compete."

E-Cars Coming to Paris Streets

The Wall Street Journal MarketPlace May 10, by Max Colchester and Ruth Bender:

"Vincent Bolloré, a French mogul, is making what might be his boldest gamble: a shared-electric-car project for the city of Paris.

"For the project to meet its year-end deadline Bolloré and his collaborators need to install 5,000 charging stations throughout Paris, recruit 1500 people, and build 3000 cars. (The article mentioned further along in the text that the 3000 car number would be met in March of 2012.)

"For Paris, which granted a contract to Bolloré, the venture is an attempt to curb congestion and pollution. By using electric cars, providing convenient drop-offs, and keeping the fees very low the program differs from cut-rate rental services in some cities. For a small subscription fee and per use charges, residents will be able to use the cars and return them to any charging station.

"If the city's four year old bicycle sharing program is any guide, Mr Bolloré will get socked with maintenance costs because of

vandalism or careless users. Around 8000 bicycles were stolen from the fleet of 20,000 in the first two years of that program.

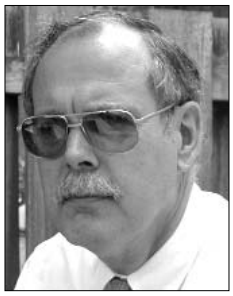
"In a Paris tender for Autolib' last year, Mr. Bolloré fended off rival bids from the public transportation unit and a consortium that included U.S. based car rental company Avis Budget Group Inc. and French national railroad SNCF. Mr. Bolloré's bid won because he promised to charge users the least, says Annick Lepetit, Paris's deputy mayor for transportation.

"Subscribers to Autolib' will be charged $17 US equivalent dollars per month, plus roughly $8 dollars for each half hour of use. They also have to leave a refundable deposit of somewhere around $200.

"Bolloré has purchased factories in Brittany and Canada to make the car batteries. Italy's Cecomp SpA will construct the Bluecar, as the vehicle will be called. It has a range of 150 miles and a top speed of 80 mph."

(Oliver Perry's personal comment. The article showed a picture of a bubble shaped prototype blue car. No other information was released in the article that provided the reader with details or specifics about the engineered characteristics of the car or type of battery it will use. *The Wall Street Journal* is a reputable source of business information. However, I find it difficult to believe that Bolloré knows what he is doing let alone having a chance to succeed in less than a year. He has made, according to the article, a ton of money in other non-vehicle ventures and expects to profit on this one. He in my mind is out of his mind or is a slick operator who has found a way to earn a profit in a losing venture. An EEVC trip to Paris next spring to see how he makes out?)

AMBIVALENCE, THY NAME IS CALIFORNIA
By California Pete



California politics is famously fractious, with the state budget still in limbo as those who want to prevent tax increases (mostly Republicans) battle those who resist cutting spending (mostly Democrats). But mixed motives can come from one party. A good example is solar power.

Governor Jerry Brown, who in April signed a bill requiring that California utilities get 33 percent of their electricity from renewable sources by the end of 2020, at the same time sent a letter to the state Senate suggesting that 40 percent was a better goal. "By 2020," says Greentech Media, "Brown wants to see California have 12 gigawatts of PV capacity and 8 gigawatts of thermal capacity."

The Federal government certainly seems to be on board. The Department of Energy recently issued a conditional loan guarantee to Solar Trust worth $2.1 billion to help the world's largest solar plant get off the ground, according to Greentech Media. "The loan will help build the first 484 megawatts of the 1-gigawatt Blythe project being put together by Solar Trust and its subsidiary Solar Millennium near Blythe, a town in Riverside County, California."

In addition, BrightSource Energy received a $1.6 billion loan guarantee for its 350 MW Ivanpah plant. And, Greentech Media goes on, "[t]he DOE also issued a conditional loan guarantee to build the 250-megawatt California Solar Ranch, which relies on PV panels."

At the same time, Democratic Senator Diane Feinstein has introduced a bill that would prohibit the building of solar plants and wind farms on large areas of desert — an effort that apparently has put parts of the U.S. solar energy industry in some danger. Feinstein wants the solar panels put on farmland or rooftops.

EV Chargers for SF

On May 9 San Francisco mayor Ed Lee announced that San Francisco will install more than 80 free charging stations for electric vehicles by the end of the year, according to the *San Francisco Chronicle*, and they would be free of charge to users though at least 2013, although they would still pay for parking.

The plan is to install the chargers in city-owned garages and at the San Francisco airport. No greenhouse gases, either — the power would come from the Hetch Hetchy hydroelectric system. Not bad, considering that the price of gas in SF recently hit $4.32.

Silliness

The city of Oakland has got itself into a bit of a tizzy about urban gardens. Nobody objects to people growing a few veggies in their back yards, but some folks manage to grow enough that they have some to sell. But the local bureaucrats suddenly decided to go after a local resident who was making about $2500 a year from selling produce from her "urban farm" and demand that she pay thousands of dollars in fines or purchase a permit (also several thousand dollars). The *Chronicle* wondered if the reason was that she was selling vegetables rather than marijuana (Oakland recently had to pull back from licensing — and taxing — a couple of multi-thousand square foot wholesale pot growing operations after being told that such farms would be a violation of federal antinarcotics laws).

But more recently the city planners seem to have had second thoughts, and have begun working on changes to the zoning code that would accommodate urban agriculture. Apparently the one resident's problems began, according to a *Chronicle* story by staff writer Matthai Kuruvila, when a local animal rights activist discovered she was also raising rabbits and selling the meat.

No more domestic car sales in SF

Chronicle business writer Andrew S. Ross recently reported that the last dealer selling domestic cars in San Francisco is going out of business. You can still buy all the Nissans, BMWs, Mazdas, Mercedes and Toyotas you like, but no Chevys or Fords. The article quotes a regional Chevy dealer: "San Francisco is not loyal to anything domestic; its allegiance is to anything but domestic."

EVs shine in Japan disaster

The International New York Times reported on May 6 that electric vehicles have been doing yeoman service in bringing relief supplies to the areas of Japan devastated by the recent earthquake and tsunami. It's not because they're especially rugged, or have high ground clearance, but because they can be charged at any working electric outlet. With gasoline hard to find (closed refineries and clogged roads preventing deliveries), this has meant that EVs can keep running when everything else is stalled.

Mitsubishi has sent 89 of its iMEVs to affected areas. The cars would run around a city all day, then charge at night.

COMING EVENTS

Solar 2011

May 16-21, Raleigh, NC. For info go to www.ases.org/index.php?option=com_content&view=article&id=18&Itemid=147

21st Century Automotive Challenge

May 21-23, State College, PA. Contact Joel Anstrom, 814-863-8904, jra2@psu.edu or go to www.vss.psu.edu/HHVRL

1st International Electric Vehicle Technology Conference 2011

May 17-19, Yokohama. For info go to www.evtec.jp.

11th Challenge Bibendum

May 18-22, 2011, Berlin, Germany. Go to www.challengebibendum/en

The History and Advantages of EVs

June 8, 6:30 pm at Lehigh Valley Green Drinks at the Allentown Brew Works. Free, plus there are $1.00 drink specials available 5:30 - 6:30

Hands-on EV Conversion Workshop

July 25-30, at the Middle Bucks Institute of Technology, Jamison PA. For info go to http://sites.google.com/site/wwwbuckscountyrenewables/newhome/ev-conversion-workshops-2011/July. For registration info email info@buckscountyrenewables.com

DoE Solar Decathlon 2011

Sept 23-Oct 2, Washngton, DC. Go to www.solardecathlon.gov/

MEETING SCHEDULE

Meetings are held in Room 49, Plymouth-Whitemarsh High School, 201 East Germantown Pike in Plymouth Meeting, PA, and begin at 7:00 p.m. There will be no meetings in July or August.

June 8

September 14

October 12

November 9

December 14