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Immigration: Arguing Past One Another

By Tom Cytron-Hysom

In this article, Tom Cytron-Hysom tries to sort out the arguments and points of view that influence our present national debate over immigration policy.

Over the past several months, the national debate over immigration has become heated and confusing. Even the language used is highly contentious as arguments flare regarding whether the term 'illegal alien' or 'undocumented worker' is most appropriate in referring to those entering the U.S. extra-legally. And, while immigration is often a wedge issue, the various perspectives do not align neatly and predictably into conservative/liberal camps in the manner of many other highly contentious issues.

A few weeks ago, I visited the Los Angeles Public Schools emergency operations center as part of a consulting project. My visit coincided with the tail-end of large pro-immigration rallies in which many thousands of K-12 students walked out of class, marching, demonstrating, and even spilling over onto a freeway and stopping traffic. Those in the emergency operations center believed without hesitation that the demonstrations had to be stopped, and students forced to return to their classrooms immediately— they saw a situation in which discipline needed to be imposed.

Other school officials offered perspectives demonstrating the complexities of the issue. For instance, I was told one of the motivations for the demonstrations was the fear of many students born in the U.S. that their undocumented parents and grandparents would be deported under national legislation being proposed. In other words, they saw an immediate threat to their families as the primary issue. It is hard to find common ground between those believing that enforced discipline is the essential issue, and those who see the question of family security as central.

A variety of perspectives

There are actually several very different debates about immigration that address various concerns. Where one's sympathies align is strongly influenced by how one perceives the relevant issues. This article will attempt to identify some of the primary debates raging under the surface in the national discourse regarding immigration, suggest underlying principles that may be helpful, and offer ideas about how adult basic education may fit into the overall issue.

Some of the primary perspectives in this debate include the following:

- *"All immigration, documented or otherwise, is desirable. Those coming here without documentation are heroically striving to build a better life for themselves and their families."*
  This approach sees inherent value in diversity, affirms our history as a nation of immigrants, and recognizes the many contributions made by immigrants. It generally does not consider social or economic stresses and costs that may be related to unregulated immigration.
- "*Immigration must be closely regulated. Those who enter the country illegally have broken the law, and should be deported. Furthermore, illegal immigrants pose a security threat."*

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This perspective argues in stark terms of right/wrong, legal/illegal. It does not generally recognize or appreciate the underlying values of diversity or engender compassion for the strong economic and social reasons motivating unregulated immigrants. Those expressing this perspective may state that the 11-12 million unregulated immigrants estimated to be in the U.S. should be immediately expelled (though how this is to be accomplished, given that there was no way to prevent their entry in the U.S. in the first place, is unclear).

- *"Undocumented immigrants are an essential part of the economy. They do jobs that native-born Americans don't want to do. They are willing to work hard. America needs their labor."*

  This primarily economic argument emphasizes the contribution of immigrant labor. It is often voiced more covertly than other arguments and tends to be a perspective favored by business (some of which exploit immigrant labor). Sometimes, those holding this perspective suggest that taxes on immigrant labor will help bridge the projected future gap in social security taxes and benefits. They neglect to acknowledge, however, that immigrants in large numbers tend to depress wages for low-skilled native-born Americans to a certain extent.

- *"Everyone coming to this country needs to speak English, and learn to live by our laws and customs."*

  This mainly cultural argument expresses concern about adjustment and acculturation. It espouses the belief that immigrants will not learn the primary language and customs of the U.S. Those with this perspective are very concerned, for instance, when they see flags from other countries being waved by immigrants in demonstrations. This argument does not acknowledge that most newcomers want to learn English and in fact are learning English faster than in any previous immigration period. Moreover, ELL and ESL programs often have long waiting lists of immigrants eager to learn English but who cannot be accommodated with limited funding.

While this list of perspectives is not exhaustive, it illustrates the complexity of sorting through the rhetoric. Are we dealing with an issue of human rights? Cultural diversity? Language? Human compassion? National security? Law and order? Economic threat? Economic resources? The personal, political, cultural, and economic philosophy of an individual tends to determine the terms in which he or she will see and argue immigration issues. In addition, most of the arguments tend to be motivated either by fear that new arrivals will somehow threaten the quality of American life or by the belief that they will enhance American life and society.

This divergence in perspectives on the immigration issue makes it very difficult to move toward a middle ground, let alone consensus. Instead, those with different views end up arguing over and past one another, the intensity increases, and ultimately there is a great deal of noise and little communication.

Some possible approaches

Are there any ways in which we can approach this impasse? Some possibilities include:

1) Recognize that all immigrants, whatever their legal status, are human beings deserving of humane treatment. Any perspective that tends to dehumanize immigrants needs to be challenged. Lumping members of any group together in simplistic terms – such as potential terrorists – denies their humanity. At the other extreme, it is not helpful to present all extralegal immigrants as heroic, denying the complexity of the motivations and personalities included in any diverse group of people.

2) Refuse to see immigrants in purely economic terms, especially as primarily economic labor units. People are not commodities, and should not be treated as such.

3) Accept that immigration is a very complex issue, and that no faction has a monopoly on truth. There are economic, cultural, legal, and security issues involved, and denying these is not helpful. But, it is important that a variety of perspectives be brought to bear in any of these areas. For instance, when discussing the economic impact of immigration, there are both pluses (a ready source of willing labor for many hard-to-fill jobs) and minuses (there is some downward impact on wages for native-born workers). Broadening the discussion in any given area, acknowledging others' concerns and then addressing these issues, can help develop a more reasoned, inclusive perspective.

4) When listening to discussion of immigration issues, try to identify the core concerns of the speaker (compassionate treatment of newcomers, cultural worries, etc.), and distinguish the underlying motivation(s). Once these are identified, the discussion can address these issues, and (hopefully) participants can avoid arguing past one another.

5) Accept that there is no solution that can completely address everyone's concerns. However, by listening carefully to various positions, and addressing the core concerns of different parties, we are more likely to

develop a reasonable and workable national policy.

How does adult basic education (ABE) fit into this debate? Since a major focus of ABE is English language instruction —by definition, a service for newcomers—we end up in the middle of the debate. Over the past several decades in Minnesota, ELL/ESL has become the largest focus of ABE services. Those who favor liberal immigration policies tend to favor adequate funding for ABE services; those opposed to immigration tend to oppose ABE funding (though I am puzzled that those expressing concern over immigrant English acquisition aren't in the forefront of efforts to improve funding for the field!).

We are also uniquely positioned to help inform the public debate. As teachers and managers, we know first-hand the struggles and history of the immigrants we serve. We are among the relatively few in society who regularly talk directly with large numbers of newcomers. We are in a unique position to articulate for society the rich and diverse experiences of immigrants and refugees—why and how they came here, how they survive, their fears and triumphs, the struggles they face. Perhaps our greatest contribution to the debate is to 'put a human face' on the issue, helping people to see past stereotypes and fears, and begin to grasp the complexity of immigration.

Immigrant Adults As Learners: Lessons From the Field

by Leslie Shore

In this article, Leslie Shore tells about her experience as a teacher for immigrants and uses it as a microcosm for discerning ways in which we all deal with new arrivals to the United States.

Having taught at the college level for a while, I assumed I was on familiar ground last year when I began teaching a class of twenty-eight students, half of whom were immigrants, who were working on a bachelor's degree. Indeed, the content was familiar, but the dynamics of the classroom and the needs of the foreign-born students were not. My reflections on this experience led me to a series of questions that would have increased my effectiveness as a teacher had they surfaced before I met the class of learners. What follows are the questions and the insights they offer especially for those who teach immigrants but also for those seeking to understand the immigrant experience of reestablishing oneself in a new country and culture.

1. What is the scope of interest among new immigrants for college-level education?

The current influx of immigrants into Minnesota from foreign countries began in 1990. Between 1990 and 2000 the number of immigrants doubled to 250,000, with approximately 50,000 coming from Africa. These immigrants have settled in the Twin Cities metro area as well as in smaller communities like Pelican Rapids and Faribault. The numbers of immigrant collegians has grown steadily as 32% of adult immigrants have some college education and wish to continue their studies so they may earn a degree from an American university.

2. What seem to be the major barriers to success for immigrant collegians?

First, they face the language barrier. This is not the "Do-they-speak-passable-English?" barrier, but rather the barrier that exists because of idioms, similes, metaphors, provincialisms, and nomenclature that are not familiar to these students because they are based on implicit cultural assumptions and practices. Instructors often do not realize that even a syllabus is infused with confusing vocabulary and expressions of what we want from the student. The reading that we assign is filled with obstacles of this type, and students may be understanding only part of the knowledge available to them. Assuming that everyone understands the question at hand may be way off the mark.

Second, students from different countries may have cultural barriers that keep them from asking for clarity from the teacher. In some countries, teachers are held in such high regard that questioning the teacher on details of an assignment is akin to disrespect. The student who wants to do well is left in a cultural quandary—go against personal cultural norms to get a needed answer or try to guess what the teacher really wants.

Third, immigrant students may have cultural barriers of a physical type. One of my practices is to shake each student's hand at the beginning of the first session of a course. It creates a bond and expresses my invitation to find me accessible. Imagine my surprise when a student told me that his culture did not allow male-female contact

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except between husband and wife. There are also cultures in which even eye contact between a teacher or a person of authority and a student is a sign of disrespect.

Fourth, students from all over the world are 'all over the map' (another common idiom!) on a continuum between individualism and collectivism, uncertainty avoidance (i.e. tolerance of ambiguity and uncertainty), and long-term orientation versus short-term orientation. In each instance, deeply set cultural values influence how learners perceive the teacher, how they respond to different teaching styles, and how they process education itself.

3. What do these students want their teachers to understand about them?

First, immigrants often have made multiple sacrifices to obtain their education. As is true with native-born adult learners, they have families and full-time jobs while they are attending classes. Most of my immigrant students, however, had two to three jobs, slept only four hours a day, were taking a full course load, and were paying for their education as they went so as not to get into debt even when that meant taking money away from basic needs. They do this while living in homes that house multiple families who depend on each other for support in the absence of extended families they have left behind.

Second, immigrants do not take any part of the education process for granted. They have a high level of understanding of the value of education and therefore demand nothing less than the best from themselves. They are quick learners and will get the information if it is presented in a way that they can grasp it.

4. What do these students want from their teachers?

First and foremost, assume nothing. If an assignment is late, don't make the assumption the student doesn't care. If the assignment misses the mark, don't assume it is because the student is lazy. The most important thing these students want from their teachers is feedback—immediate, specific, and straightforward feedback. The learning curve with immigrant students tends to be remarkable. Feedback on one assignment is immediately put into place in the next assignment. Within the thirteen weeks of the course I taught, I had a number of students move from grades of 'D' to 'A' s because of the regular, specific, applicable feedback I gave to them.

5. Why is it our responsibility to understand the immigrant student?

Each student that enters our classroom deserves the same professional level of education. Unlike students with physical and mental disabilities who are visible or documented, immigrant student have invisible barriers that we don't know about and they don't recognize as obstacles to effective learning. Our awareness of these barriers can make all the difference.

6. What are specific things that teachers can do to prepare themselves to work effectively with immigrant adult learners?

First, find out where each student is from and do some quick research into the cultural norms they carry about the educational process. Also find out about the syntax of their native language. Second, have each student in the class write a two-page biography so that they can describe their country of origin, identify what is important to them, and demonstrate their writing style. Important information surfaces from this simple practice that can inform one's understanding of the student learning styles and their command of written English. Third, personalized immediate feedback is essential for writing assignments, in-class participation, and small group work. Fourth, when setting up group projects, insure that there is at least one student in the group who is inclusive-minded and can invite participation from everyone. I do not assign group projects until the third week of a course so that I can watch small group exercises and find inclusive-minded students.

As educators, we strive to provide students with their best chance for achieving learning outcomes that will give them skills and knowledge they can apply in their personal and professional lives. Each student is equal in importance, and it is our duty to do all we are capable of to enable each student to excel if they so desire. Immigrant students bring tremendous richness to the classroom. Their perspectives, values, and desire to learn are inspiring for the instructor as well as for other students. There is something that immigrant students understand in their bones about education that makes teaching them both an honor and a challenge. John Dewey said it best: "Education is a social process. Education is growth. Education is, not a preparation for life; education is life itself."

Journey to the New World:

A Brief History of Jewish Immigrants' Lives in Minneapolis

by Rhoda G. Lewin

In this article, Rhoda Lewin reminds us that earlier groups of immigrants have also encountered suspicion and bigotry when they first arrived in this country.

Small numbers of German Jews began emigrating to the United States in the 1850s, but from 1880 until 1924, when the Johnson Act virtually closed off all immigration to the United States —one reason why 6,000,000 Jews and many others could not escape the Holocaust —almost 2,000,000 East European Jews also came to the New World. In 1880 only 3.4% of the world's Jews lived in the United States, but by 1925 it was 24.7%!

Most landed at Ellis Island. Although they settled in every state and territory, the East Coast was the liveliest, busiest part of America, and the place where many relatives and friends had already settled, so from 1899-1910, for example, most Jewish immigrants chose New York, Massachusetts, Connecticut, New Jersey and Pennsylvania. By 1925 there were over 1,750,000 Jews in New York State; they were one third of the population in New York City!

Distinctive characteristics

Jewish immigration had two distinctive characteristics. First, almost 94% came from Eastern Europe, where education and professions were largely closed to Jews. Second, there was the "family aspect" of their journey to the New World. Male immigrants to America had traditionally outnumbered women, 150 to 100, but among Russian Jewish immigrants between 1900 and 1925, for example, almost half (45.8%) were women and one-fourth (25.3%) were children under 14!

Jews were less than 10% of the total immigration to the U.S. between 1880 and 1910, however. Europe's population had almost doubled between 1750 and 1850, and although almost 25,000,000 Europeans had left for America by 1914, the numbers continued to grow. Pressure on food production and distribution in Europe, for example, was enormous; the choice for many was to emigrate, or starve!

Another factor was the labor famine in the United States, where industrialization was proceeding much more rapidly than in Europe, so America needed workers. Jewish immigrants were usually traders or artisans, and they became 49% of America's clothing workers, 16% of our woodworkers, 50% of our jewelers and watchmakers, 34% of our printers, and 41% of our leather workers!

A third factor spurring immigration was improved transportation. Journeys that in 1800 would have been unimaginable, now became much easier. In 1900 it only took a week to cross the Atlantic; the price was only $12, and included food. Food was often inadequate or spoiled, and sleeping quarters were crowded and smelly, but there was no other choice, especially after information about the wonders of America —rich soil and industries that offered jobs and independence —began filtering into Europe. Europe was saturated with information about the United States—in newspapers, magazines, and books written by travelers. American land companies, railroads, and travel agents set up agencies overseas, advertised in newspapers, and distributed pamphlets and guidebooks. One Minnesota pamphlet claimed that Minnesota's death rate was only half the rate for the entire United States, so many people who saw that pamphlet chose Minnesota as their destination! Folksingers sang of workers who would rather be "a slave in America" than in Russia, and Sholom Aleichem wrote about an emigrant to America who told his friends, "Everyone here is having a terrible time, but is making a living." The sweatshop was a horrible place to work, but it was the first step toward a life of freedom and prosperity in America. Of course the newcomers wrote letters home, describing the good food, lack of beggars, equality of opportunity, and most of all the freedom in America. Many Ellis Island arrivals came to join friends or relatives; 58% of the Jews arriving in 1910 had tickets sent by friends or relatives already in the United States.

Perhaps most interesting was the new way of life Jews created in their new world. At first, Jewish immigrants recreated the ghetto, because they had to "belong" to a community. But the new ghetto was not a slum, as it had been in the Old World, and gradually their lifestyle changed. In the Old World, youthful marriage had been a duty, to obey the Biblical command to be fruitful and to multiply... but now, in America, young people spent more time in school, and began to feel independent. They were now "Americans," and anything that was not American was something to be ashamed of! Boys sold newspapers, and became "street merchants" to help support their families, but boys and girls also went to clubs, dances, parties, hayrides, and picnics, and many boys brought home prospective spouses whose families were total strangers to their parents.

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Jewish immigration into Minnesota reflects this pattern. In 1907 there were about 4,500 Jews living in North Minneapolis, and 3,500 on the South Side—most of them Russians, Lithuanians, Romanians or Poles. In the fourteenth U.S. census in 1920, 5.1% of the white foreign-born in Minneapolis said Yiddish or Hebrew was their "mother tongue."

Jewish life in Minnesota

By 1936, Minneapolis had 16,260 Jewish residents —3.5% of the city's population of 464,356, a percentage that exactly matched the figure for the entire United States! And although some of the earliest arrivals had settled near Seven Corners, and 70% of the Jewish residents now lived on the North Side or lived in "poor neighborhoods," others were already living near Lake of the Isles and Lake Calhoun.

And as the years went by, some Jews left their early neighborhoods because they wanted to shed their old-world Orthodox Jewish lifestyles and be closer to Conservative or Reform congregations, or get away from the watchful eyes of their old neighbors so they could become Unitarians, Christian Scientists, or atheists! But most Jews, although they became more "Americanized" as they became more prosperous and more educated, continued to live in areas where they could have Jewish friends and Jewish playmates for their children.

As a pioneer in oral history in the mid-1970s, before Studs Terkel made it acceptable as "real history," I interviewed many immigrants for my Ph.D. dissertation. One interviewee recalled that "Everybody knew you, and you knew everybody; you were part of the community, and the community was part of your family." Another remembered that in the small neighborhood stores, "Your grocer and your butcher became personal friends." Another said, "You tended to behave properly, because your parents *and* your neighbors were watching after you and for you." On Fridays "you could literally smell the Sabbath, the bread baking and the chicken cooking... the 'reyach' (aroma) of Judaism was as important to the sense of community as the 'ruach' (spirit)."

But there was also a serious problem—anti-Semitism. Chapters of the Silver Shirts and the German-American Bund met regularly in Minneapolis. Rev. Luke Rader and Rev. W. B. Riley, pastor of First Baptist Church and president of the Northwestern Bible Institute, delivered anti-Semitic diatribes, and Gerald L. K. Smith and other nationally known notorious anti-Semites were welcome guest lecturers at churches and public meetings. In Minneapolis during the 1930s no Jew belonged to country clubs, or even the American Automobile Association. The AAA refused Jewish members because they might want to use the AAA clubhouse south of the city—where I attended the wedding of my best friend at North High School, a Norwegian Lutheran who taught me that other ethnic groups also disliked each other when she joked that "a smart Swede is a dumb Norwegian!"

Elks, Masons, Rotary, Kiwanis, Toastmasters, and other clubs had no Jewish members. A 1936 survey showed that 60% of local retailers and manufacturers didn't hire Jews, and even Jewish merchants hesitated to hire Jews, for fear of "offending" their customers. When Harold Stassen ran for governor in 1938, Republicans attacked incumbent DFL governor Elmer Benson for hiring three Jews to work in state government! As late as 1947 there were only thirteen Jewish teachers and three Jewish nurses in Minneapolis public schools, because 30% of the schools' principals admitted to being "uncertain of" or "opposed to" hiring Jews.

There are of course exceptions to these stories about discrimination and rampant anti-Semitism. The charitable tradition of the Jewish community provided a "cultural bridge" for Jewish philanthropists, who joined the city's elite on committees for child care, unemployment relief, hospital and community fund drives, and improvement of race relations. In 1914 Jonas Weil, a prominent insurance man and one of the earlier, well-assimilated German Jewish immigrants, served on a Minneapolis Civic and Commerce Association's "blue ribbon committee" to investigate and replace dilapidated housing. Rabbi Amos Deinard of Temple Israel represented Minnesota on a National Conference of Charities and Corrections, and was the first president of the Minneapolis chapter of the NAACP. He was also on the Minneapolis Board of Education's advisory committee, the Community Chest Council, the mayor's Committee on Unemployment, and the Civic and Commerce Association, and he lead Liberty Loan campaigns during World War I.

Discrimination

In spite of this participation in community activities, however, there was continued discrimination against Jews. Jewish doctors were not permitted to send their patients to most hospitals, which was why they built Mt. Sinai Hospital. Some companies wouldn't sell property insurance to Jews because they supposedly had a "well-known tendency" to burn down their businesses, and some downtown office buildings refused to rent offices to Jewish professionals.

Nationally, the B'nai B'rith Anti-Defamation League had been fighting anti-Semitism since 1913, and the

Minneapolis ADL was organized in 1934. In 1938, representatives from nineteen communities organized the Minnesota Jewish Council, the first statewide independent community relations council in the U.S., to "enlighten the public on the status of Jews in American life, and to investigate, expose, and counteract hate groups and hate literature." They contacted the *Minneapolis Journal*, one of the city's three daily newspapers. The paper assigned a young reporter named Eric Sevareid to follow the Silver Shirts; after Sevareid's daily newspaper features held the Silver Shirts up to public ridicule, many people stopped attending their meetings! The battle against prejudice and discrimination is never-ending, but a beginning had been made in Minneapolis.

Society changed too. My maternal grandparents lived in the "poor neighborhood" of row houses that were torn down to make way for the freeways coming into downtown Minneapolis. In 1956 I was living in South Minneapolis; my next door neighbor, watching our four little children splashing around in a wading pool, suddenly said, "You know, Rhoda, I've never known anybody Jewish before... and you're just like everybody else!" And although Edina and Cedar Lake had been off-limits to Jews in 1930 when they were being developed, when we bought our house at 24 Park Lane in 1961, with Cedar Lake in our backyard, our neighbors were very friendly. Our children played together, and went swimming together, and we all got together for "block parties" every summer.

The Jewish cultural values formed over 2000 years of dispersion—family loyalty, hard work, high value on education, charity, and adaptability, and willingness to change—were admired in America, and were also conducive to success. We've elected two Jewish Senators, Rudy Boschwitz and Paul Wellstone, and a Jewish mayor, Arthur Naftalin. We can only guess what the future will bring, but a vibrant American Jewish community hopefully will continue to exist, and to produce more Nobel prizewinners, more pioneering medical procedures, more famous musicians and filmmakers, and more wonderful businesses and cultural and social organizations for our communities.

Another Kind of Fusion

by David A. Wesley

Abstract:
Attempts at cold fusion have been discounted primarily because no measurable helium or neutrons have been obtained as fusion products (helium and free neutrons being the principle products of the familiar H-bomb fusion). Some experiments have indicated unexplained silver, chromium, and iron elements not origially present in the test apparatus. This paper proposes a different fusion process in which deuterium and palladium nuclei fuse producing one of several possible other heavy nuclei (incl silver), signifcant energy per fusion, and no free neutrons. Rough computations based on a simple assumed lattice structure and dimensions for the palladium electrode, indicate that the number of fusions per second, even at room temperatures, could provide the modest surplus energy outputs seen in typical cold fusion experiments.

Background:
In "ordinary" hydrogen fusion—the kind practiced in H-bombs—two heavy hydrogen (H^2, or deuterium) nuclei are fused to create a light Helium (He^3) nucleus and a neutron, and 3.27 MeV of energy is released[fn1]. Where does the energy come from? The two H^2 nuclei each have one proton and one neutron, and the He^3 produced has two protons and one neutron, so we end up with the same two protons and two neutrons. However, with careful measurement, we observe a net loss of mass:

	mass (amu)		mass (amu)		total mass (amu = atomic mass units)
H^2	2.0141	+	H^2 2.0141	=	4.0282 amu (MeV = million electron volts)
He^3	3.0160	+	n 1.0087	=	4.0247 amu
	→		So we lose 0.0035 amu		which, using $E = mc^2$, yields energy = 3.3 MeV

This is not much energy, but we're using only two atoms of H^2. However, with 4 mg of H^2, containing $2 \times 6 \times 10^{20}$ atoms we get $3.3 \times 6 \times 10^{20}$ MeV or about 300 Mega Watt-Seconds [fn2] of energy. The mass of the nucleus of a given atomic isotope is not just the combined masses of the neutrons and protons they contain, but also includes a mass equal to the "binding energy" that holds the nucleus together. This is very high for an H^2 or H^3 nucleus, and initially decreases as the size of the nucleus increases: Each of the following isotopes has equal numbers of protons and neutrons to make the comparison easier to see

	isotope	mass	
Hydrogen	H^2	2.0141	
Helium	He^4	4.0026	2 x H^2 would be 4.0282
Beryllium	Be^8	8.0053	4 x H^2 would be 8.0568
Carbon	C^{12}	12.0000	6 x H^2 would be 12.0846
Oxygen	O^{16}	15.9949	12 x H^2 would be 16.1128

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C^{12} has a mass of exactly 12 amu by definition: Since 1967 the amu has been defined as 1/12th of the mass of a C^{12} nucleus. It's easy to see how fusing H^2 into each of these other elements would, if one could make it happen, generate more energy. However, not all possible fusions of H into heavier elements will give more energy per nucleus of H consumed than simply fusing H + H → He. To make this easier to see, one can compute the "packing fraction" by dividing the mass of each isotope by the number of nucleons (protons and neutrons) in its nucleus and subtracting 1.

Fraction	isotope	mass	packing
Hydrogen	H^2	2.0141	0.007050
Helium	He^4	4.0026	0.000650
Beryllium	Be^8	8.0053	0.000663
Carbon	C^{12}	12.0000	0.000000
Oxygen	O^{16}	15.9949	-0.000319
Iron	Fe^{58}	57.9330	-0.001155
Palladium	Pd^{106}	105.9035	-0.000911
Radium	Ra^{214}	214.0001	0.000000

It's now easier to see why He^4 + He^4 → Be^8 is not a likely fusion reaction: The average mass per nucleon is lower for He^4 than for Be^8 and we would LOSE a little energy in the fusion. It also explains why Be^8 is likely to fission into He^4 + He^4 (yet not very likely, since so little energy is given off). Note that after iron, packing fractions start to increase again, and after Radium all isotopes have packing fractions greater than Carbon. Fusing H^2 into isotopes heavier than iron is not going to give us as much energy (0.007050 + 0.001155 = 0.008205 amu) per nucleon as fusing into iron would, though fusing H^2 even into U^{238} would still give us a lot of energy (0.007050 - 0.000213 = 0.006637 amu) per nucleon. Such fusions to heavy nuclei are still only theoretical. While it is suggested that some of these fusions do take place in nova and supernova, we have not managed it on earth—yet. All of our mainstream attempts at controlled fusion have been based on the H + H →He + n reactions producing Helium (He) and neutrons (n).

Commentary:
One of the oft-repeated arguments against "cold fusion" is that no Helium has been created. This is not really a valid argument, as it assumes that the only possible fusion reaction is H + H → He. I suggest that the energy generated by "cold fusion" is produced by the fusion of heavy hydrogen and palladium producing Rhodium (Rh), Silver (Ag), Cadmium (Cd) or other isotopes of Palladium (Pd), with a net loss of mass that is converted to energy. The high concentration of hydrogen that can be absorbed by a Palladium electrode results in the significant probability of Hydrogen-Palladium fusion.

Possible mechanism:
At saturation, Palladium (Pd) will absorb very large amounts of Hydrogen to form Pd_2H, i.e., one H atom for every 2 Pd atoms in the rod. This high ratio implies that the H atoms are not clinging to the surface of the Pd rod, but are diffused throughout the structure[fn3]. I suggest that the H atoms are not randomly distributed, but will become trapped in the most "attractive" locations between pairs of Pd atoms in the crystal structure, and provide a specific Pd_2H lattice. Within this structure, the separation between Pd and H nuclei is not constant, but varies as they oscillate in response to temperature. Nuclei of different isotopes of Pd will oscillate with different periods, making the solid state properties of Pd hard to predict, but probably insuring the separations between adjacent Pd nuclei will vary more wildly than they would if all were of the same isotope.

It would seem possible that a harmonic relationship between the Pd-Pd oscillations and those of a heavy hydrogen nucleus (D) trapped between them could concentrate this thermal energy into the lighter D nucleus, causing it to periodically attain very high energies. It would then oscillate between the adjacent Pd nuclei with sufficient energy to allow quantum tunneling[3] and Pd + D fusion reactions to take place. Even if the probability of such tunneling was very low for individual D nuclei, the large number of trapped D-nuclei, and the high frequency with which each would repeatedly encounter Pd nuclei, might produce enough fusions per second to explain the energy produced by cold fusion experiments.

Reactions:
Three possible fusion reactions could arise from this mechanism: p + Pd with light hydrogen (H^1), or n + Pd, or D + Pd with heavy hydrogen (where p = proton and n = neutron). However, since all of the "cold fusion" experiments that report positive results do so while working with Heavy hydrogen, I will ignore the possible p + Pd reactions. It would also appear to be much more likely that n + Pd reactions are occurring, than D + Pd, simply because the energies needed for D tunneling would be so much higher. It is easier to believe that the heavy hydrogen nuclei (D), are separated into n and p before actual fusion takes place, so the net reactions are D + Pd → p + (n + Pd) → p + decay product(s) + energy. Because Pd has a remarkable number of naturally-occurring isotopes (6 stable and one long-lived radioactive), there are seven n + Pd fusion reactions that may be occurring:

Naturally occurring isotopes

	Pd^{102} (1.02%)	**Pd^{104} (11.14%)**	**Pd^{105} (22.33%)**	**Pd^{106} (27.33 %)**	**Pd^{107} (<<0.01%)**	**Pd^{108} (26.46%)**	**Pd^{110} (11.72%)**
M	101.9056077	103.9040349	104.905084	105.9034831	106.9051285	107.9038945	109.9051524
+d	2.0141018	2.0141018	2.0141018	2.0141018	2.0141018	2.0141018	2.0141018
-p	1.007825	1.007825	1.007825	1.007825	1.007825	1.007825	1.007825
net mass	102.9118845	104.9103117	105.9113608	106.9097599	107.9114053	108.9101713	110.9114292

Initial Fusion products: (caused by absorption of neutron from deuterium)

+n->	**Pd^{103}**	**Pd^{105}**	**Pd^{106}**	**Pd^{107}**	**Pd^{108}**	**Pd^{109}**	**Pd^{111}**
M	102.9060872	104.905084	105.9034831	106.9051285	107.9038945	108.9059535	110.907644
net mass	***0.0057973***	***0.0052277***	***0.0078777***	***0.0046314***	***0.0075108***	***0.0042178***	0.0037852
MeV	***5.40018495***	***4.86960255***	***7.33807755***	***4.3141491***	***6.9963102***	***3.9288807***	***3.5259138***

Decay products from the initial fusion product

half-life	17d	stable	stable	6.5E 6 yr	stable	13.7 h	23.4 min
decay MeV	0.543	--	--	0.033	--	1.116	2.19
->	**Rh^{103} (ec)**	**--**	**--**	**Ag^{107} + B**	**--**	**Ag^{109} + B**	**Ag^{111} + B**
M	102.9055042	--	--	106.905093	--	108.9047555	110.9052947
ec(+) or B-	0.0005486	--	---	-0.0005486	---	-0.0005486	-0.0005486
net mass	***0.0011316***	***---***	***----***	***-0.0005131***		***0.0006494***	***0.0018007***

Further decay products

half-life	stable	stable	stable	stable	stable	stable	7.45d
decay MeV	--	--	--	--	--	--	1.037
->	--	--	--	--	--	--	**Cd^{111} + B**
M	--	--	--	--	--	--	110.9041816
ec(+) or B-	--	--	--	--	--	--	-0.0005486
net mass	--	--	--	--	--	--	***0.0005645***

Final decay products

+n->	**Rh^{103} (stable)**	**Pd^{105} (stable)**	**Pd^{106} stable)**	**Ag^{107} (stable)**	**Pd^{108} (stable)**	**Ag^{109} stable)**	**Cd^{111} stable)**
M	102.9055042	104.905084	105.9034831	106.905093	107.9038945	108.9047555	110.9041816
net mass	***0.0069289***	***0.0052277***	***0.0078777***	***0.0041183***	***0.0075108***	***0.0048672***	***0.0061504***
MeV	***6.4542704***	***4.8696026***	***7.3380776***	***3.8361965***	***6.9963102***	***4.5337968***	***5.7290976***

Proof	Find Rh^{103}	Pd $^{105/104}$ atio?	Pd $^{106/105}$ ratio?	Find Ag ^{107}?	Pd $^{107/108}$ ratio?	Find Ag^{109}	Find Cd^{111}
other	17 day γ HL			6,500,000y β HΛ		13.7 hr β HL	23.4 min β HL

Discussion.

Any of these fusion reactions would produce significant energies. Each reaction is at least twice as efficient, in terms of extracting energy from a single deuterium atom, as the D + D → H + He^3 in thermonuclear devices which produced 3.3 MeV while consuming two D nuclei. Of course, not all of the above reactions are equally likely to be happening. We could look for the following reaction evidence:

- n + Pd^{102} → Rh^{103} is possibly easy to detect. The 17 day half-life of Pd^{103} allows significant Rh^{103} to accumulate in a modest time. Detection of the gamma emissions from the decay of Pd^{104} is also probable with a 17-day half-life. Experimenters haven't reported gamma emissions, so this process seems unlikely.
- n + Pd^{104} → Pd^{105} is difficult to detect, as Pd^{105} (a common, stable isotope) should be present in large quantities already. Measuring the Pd^{104} / Pd^{105} isotope ratios with great precision before and after the experiment might serve to detect the process at work.

Continued on following page

Another Kind of Fusion *continued from previous page*

- $n + Pd^{106} \rightarrow Pd^{107}$ could be detected by the appearance of Pd^{107} in the sample. The long half-life of Pd^{107} would make finding Ag^{107}, or detection by decay to Ag^{107} very unlikely, but an increase in the rare isotope Pd^{107} would be easier to detect and hard to explain in any other way.
- $n + Pd^{107} \rightarrow Pd^{108}$ is difficult to detect: Pd^{108} is a common, stable isotope most likely present in large quantities already. Yet, this might be a reason "successful" cold fusion experiments have reported gradual increases in energy over time. If $n + Pd^{107}$ is much easier to produce (n- capture cross-section for Pd^{107} vastly larger than for Pd^{106}) then $n + Pd^{106} \rightarrow Pd^{107}$ could slowly increase available Pd^{107} to a point where the two processes were proceeding at equal rates. Net energy produced would increase (4.3 > 11.3 MeV per unit time), giving an "S-curve" energy output over time with an 11.3 / 4.3 ratio.
- $n + Pd^{108} \rightarrow Pd^{109} \rightarrow Ag^{109} + B$ is the easiest to detect, either by Beta-emission with a 13.7 hour half-life, or by the build-up of Ag^{109}.
- $n + Pd^{110} \rightarrow Pd^{111} \rightarrow Ag^{111} + B \rightarrow Cd^{111} + B$ is also detected fairly easily, by the build-up of Cd^{111}, by the build-up of radioactive Ag^{111}, or by the Beta-emission from the Ag^{111} (half-life of 23.4 min).

Questions for experimenters:
1) Are there "cold fusion" experiments that have detected any of the above indicator evidence? 2) Does a build-up of silver, cadmium, or rhodium exist? 3) Are there distinctive beta-emissions? Or are beta-emissions largely blocked by surrounding materials in "cold-fusion" experiments and thus difficult to detect?

Commentary:
A similar table can be compiled for the D + Pd → Ag → (decay products + energy) fusion processes. Because Pd has a remarkable number of naturally-occurring isotopes (6 stable plus one long-lived and radioactive one), there are seven D + Pd fusion processes that may be occurring:

Naturally occurring isotopes:

	Pd^{102} (1.02%)	**Pd^{104} (11.14%)**	**Pd^{105} (22.33%)**	**Pd^{106} (27.33 %)**	**Pd^{107} (<<0.01%)**	**Pd^{108} (26.46%)**	**Pd^{110} (11.72%)**
M	101.9056077	103.9040349	104.905084	105.9034831	106.9051285	107.9038945	109.9051524
+d	2.0141018	2.0141018	2.0141018	2.0141018	2.0141018	2.0141018	2.0141018
net mass	103.9197095	105.9181367	106.9191858	107.9175849	108.9192303	109.9179963	111.9192542

Initial Fusion Products: (caused by absorption of neutron from deuterium)

+n->	**Ag^{104}**	**Ag^{106}**	**Ag^{107}**	**Ag^{108}**	**Ag^{109}**	**Ag^{110}**	**Ag^{112}**
M	103.908629	105.9066664	106.905093	107.905956	108.90475555	109.906107	1110907005
net mass	***0.0110805***	***0.0114703***	***0.0140928***	***0.0116289***	***0.0144748***	***0.0118893***	***0.0122492***
MeV	***10.3214858***	***10.6845844***	***13.1274432***	***10.8323204***	***13.4832762***	***11.0748830***	***11.4101298***

Decay products from the initial fusion product

half-life	69.2 m	8.28 d	stable	2.37 m	stable	13.7 h	3.13 h
decay MeV	__	3.055	--	--	--	--	--
=>	Pd^{104} (ec)	Pd^{106} (ec)	--	Cd^{108}+B	--	Cd^{110}+B	Cd^{112}+B
M	103.9040349	105.9034831		107.904184		109.903002	111.902758
ec(+) or B-	0.0005486	0.0005486		-0.0005486		-0.0005486	-0.0005486
net mass	***0.0051427***	***0.0037319***		***0.0012234***		***0.0025564***	***0.0036984***

Final decay products

+n->	**Pd^{104} (stable)**	**Pd^{106}(stable)**	**Ag^{107} (stable)**	**Cd^{108} (stable)**	**Ag^{109} (stable)**	**Cd^{110} (stable)**	**Cd^{112}(stable)**
M	103.9040349	105.903483	106.905093	107.904184	108.9047555	109.903002	111.902758
net mass	***0.0162232***	***0.0152022***	***0.0140928***	***0.0128523***	***0.0144748***	***0.0144457***	***0.0159476***
MeV	***15.1119108***	***14.1608493***	***13.1274432***	***11.979175***	***13.4832762***	***13.4561696***	***14.8661894***

Proof	$Pd^{102/104}$ ratio	$Pd^{104/106}$ ratio	Find Ag^{107}	Find Cd^{108}	Find Ag^{109}	Find Cd^{110}	Find Cd^{112}
other	69.2 m γ HL	8.28 dy γ HL		2.37m β HL		24.6 sec β HL	3.13 h β HL

Concluded on page 12

Afterwords...

Any reader who has gotten this far in this edition of *Practical Thinking* is no doubt scratching his or her figurative head and wondering why the editors printed three pages of scientific charts. Here's why: several years ago David Wesley noticed some anomalies in cold fusion experiments that might suggest avenues for further research. He is not in a positon to do the research himself, but once his ideas are published in a journal of record then others can pursue the suggested research. One purpose of this journal is to give our members an opportunity to publish new ideas. The editors are grateful to David Juncker for his help is putting Wesley's observations into a publishable form.

The other topic for this journal is immigration. This issue is provoking an uncommon amount of controversy in this country, controversy which—unlike some other issues we have tackled—did not dry up between the time we selected the theme and the time the journal was printed. Tom Cytron-Hysom and Leslie Shore have offered some very practical suggestions for welcoming and helping the immigrants in our midst. In her history of Jewish immigration to the TwinCities, Rhoda Lewin reminds us that the economic forces that propel immigration have been present throughout American history and that the human reactions of bigotry, prejudice, and isolationism have also been present in other eras.

Thus this journal tackles two of the issues on the cutting edge of our modern world: energy and immigration. It does not provide answers, but it may provide some food for practical thinking about these questions.

We sincerely hope that we will get a book discussion going for the next issue; if you are interested in being a part of this effort, please let me know.

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Another Kind of Fusion *continued from previous page*

Discussion.

Any of these fusion reactions would produce very significant energies. Each is at least four times as efficient as the thermonuclear fusion, $D + D \rightarrow H + He^3$, in terms of extracting energy from a single deuterium atom. Again, not all of the above are likely to be happening. Seeking indications would include:

- The $D + Pd^{102}$ and $D + Pd^{104}$ reactions are contra-indicated, as the gamma released by the electron capture (EC) should have been observed.
- Betas released by the 3 reactions ending in Cd isotopes might be harder to detect, but a build-up of Cadmium isotopes would be detectable.
- The two direct conversions to stable Ag isotopes would be much easier to detect.
- Either the n + Pd or D + Pd fusions will produce much more energy than the $D + D \rightarrow H + He$ fusions, because the neutron or neutron and proton from the D are being fused into a final isotope that is much further down the packing curve than He.

One last investigation: use Palladium enriched in specific isotopes. I strongly suspect regional Pd samples have different isotopic mixes, possibly leading to the success or failure of some experiments.

References and Notes:

Introduction to Nuclear Physics by Harold Enge. Addison Wesley Publisers: Reading, MA 1966.
Introduction to Solid State Physics by Charles Kittel, John Wiley & Sons: New York, London, Sidney 1966.

Fn 1 H-bombs can also make use of another hydrogen fusion reaction, involving the still heavier isotope tritium (H^3): $H^3 + H^2 => He^4 + n + 17.6$ MeV. This gives a lot more energy per gram of bomb, but as H^3 is much rarer than H^2, making a bomb such as this is more expensive, and as H^3 is also radioactive—unlike H^2— the H^3 bombs will gradually lose "potency" in storage.

Fn 2 100 Mega Watt-Seconds^2

Fn 3 An explanation of the "tunneling" behavior that makes the Pd fusion possible is can be found at <mnindependentscholars.org/tunneling>.

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