The answer, it seems to me, is that "risk capital," the money that makes new jobs when invested in growing companies or in new businesses, must come largely from the people making more than $5000 a year. The others usually cannot afford to take any risks with their savings.

It was the savings of this 10% group that made possible the huge growth in American industry and American jobs and our progress in raising American living standards in the years before 1930.

Now the government is taking so much from the 10% group in taxes that they cannot afford to risk any savings they manage to accumulate. Most of their savings now go to insurance companies and savings banks which are barred by law from making risky investments or investments even in seasoned common stocks.

The flow of risk-capital from this 10% group can only be renewed by reducing their taxes. The result will benefit everyone over the difficult years to come by providing more and steadier employment for all.

The cost of the presently proposed reduction, *less than 1% of the national income*, can well come out of current revenue surplus. It will be repaid many-fold by the new enterprises it will stimulate.

4. Jobs will be lost if risk-capital does not increase.

Unless the flow of risk-capital into business *can be doubled* and *trebled* in the next few years, business investment in job-making new plants and equipment will drop sharply. The McGraw-Hill survey of prospective capital expenditures, reported in the previous editorial in this series, made that quite clear.

When such a drop in business investment has come in the past, it has brought with it a general slump in business – and unemployment.

As we work through the enormous demand for goods of all kinds built up during the war years, and as the *war-accumulated savings* of businesses and individuals are spent, it will be harder and harder to keep production and employment at today's high levels.

Then—at the very time that we shall need all the *drive to maintain prosperity—we shall be hit by the full impact of the tax revolution.*

5. Compounding these troubles is a tax system as out-of-date as an oxcart.

Twenty years ago, when taxes took only [illegible] cents out of the national income dollar, our [illegible] trap tax system was little more than a nuisance. Today, when it takes twice as big a bite, its double taxing of the earnings of investors, its discriminatory excises, and the overlapping of federal, state, and local levies are a fatal handicap. A new system, a fair system, a rewarding system, is a necessity if American initiative and enterprise are to have a fair chance.

What Congress does now about federal taxes will bear crucially on our ability to sustain prosperity.

By demanding economy in government and by re-designing the tax system to stimulate initiative and risk-taking, Congress can multiply many times our chances of maintaining full employment and of raising living standards.

By allowing people to save more and by renewing the incentive to risk capital in new enterprise, Congress can actually insure a bigger tax return in the years ahead. More business will result – and pay more taxes.

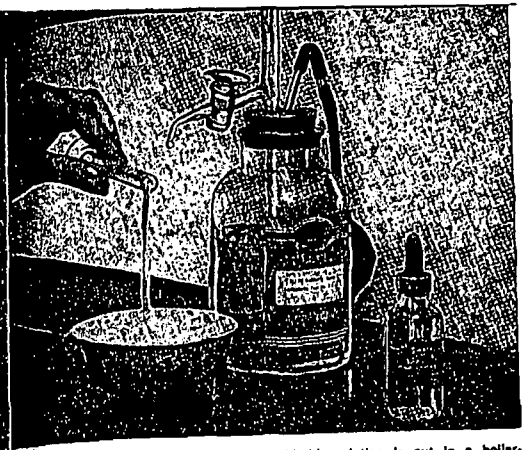
That is the only way that a free people with a free economy can carry the tax load.

That is the best way that our government can improve our chances of keeping our jobs and of getting ahead. I suggest that you discuss these vital matters with your chosen representatives in Congress, in your state government, in your local community.

James H. McGraw, Jr.

President, McGraw-Hill Publishing Company, Inc.

THIS IS THE 68TH OF THE SERIES



EXAMPLE OF PRECIPITATION: Strontium chloride solution is put in a boiler-water sample to get rid of carbonates when making a hydroxide-alkalinity test

Why Inorganic Materials Precipitate

By DR R C ULMER, *Technical Director, E F Drew & Co, Inc*

Here's how chemicals act in solution. Adding them to water lowers solubility product of scale-forming compounds, precipitating them outside the boiler or as sludge inside

WE ALL KNOW that under certain conditions materials dissolved in water come out of solution. When this happens because of the concentrating effect of evaporation, as for example in boiling, we say solubility is exceeded. When it results from adding another chemical, precipitation takes place. The two processes are really analogous because both depend on solubility.

What Is Solubility? Solubility means the amount of a solid that can dissolve in a given volume of water. If common salt (NaCl) is thrown into a tub of water at room temperature and the water stirred, solid salt dissolves until finally no more will go into solution. If the solution is filtered and completely evaporated the salt remains, and for each gal evaporated about 3 lb of salt are left. If a solution containing less than this amount is boiled, nothing happens until this concentration is reached. Salt then comes out of solution in the form of small crystals, and the process continues until all water is gone.

Reaction Products. Several materials complicate the situation because the solubility of each is involved. We must also consider solubilities of reaction products between the materials. To understand the reaction, let's see what happens when materials dissolve. We are limiting the discussion to inorganic materials because water treatment is most concerned with them.

When inorganic materials dissolve in water they break up or dissociate into ions. As an example calcium sulphate, $CaSO_4$, forms calcium, Ca^{++}, and sulphate, SO_4^{--}, ions,

$CaSO_4$ in water $\rightarrow Ca^{++} + SO_4^{--}$

In the same manner trisodium phosphate, Na_3PO_4, forms sodium, Na^+, and phosphate, PO_4^{---}, ions,

Na_3PO_4 in water $\rightarrow 3\,Na^+ + PO_4^{---}$

If we add both calcium sulphate and trisodium phosphate to water we are concerned not only with the solubility of each but also with the solubility of various combinations of ions—for example, of sodium sulphate, Na_2SO_4, and calcium phosphate, $Ca_3(PO_4)_2$. To determine what, if anything, will precipitate or come out of solution we must consider the *solubility product* of the possible combinations of ions.

Ionic Product. By our experiment we found that only a certain amount of common salt dissolves at a given temperature. This is true of every other substance. When all material has dissolved that can, the product of the amount of ions present is called the solubility product and is expressed in gram ions per liter. For example, when as much calcium sulphate is dissolved in water as will dissolve, about 1.07 grams are present in each liter of solution. This amounts to 1.07 ÷ 136 (grams per liter ÷ molecular weight) = 0.0079 gram molecular weights of calcium sulphate, or 0.0079 gram ions each of calcium and sulphate ions per liter.

Product of the concentrations of these ions (0.0079x0.0079) is 0.000062 or 6.2×10^{-5}. This is the solubility product for calcium sulphate. It means that if calcium and sulphate ions are present in a solution in such amounts that their product exceeds this value, calcium sulphate will precipitate until this value is reached.

In water treatment, this principle is the basis for most precipitating reactions that occur. For example, hardness salts—calcium and magnesium—are precipitated by adding other chemicals that cause the solubility products for the various ion combinations to be exceeded so they precipitate as definite compounds. This is true for both external and internal treatment.

If soda ash is the treating chemical, calcium precipitates as calcium carbonate. If phosphate is used and an excess carried, calcium precipitates as calcium phosphate even though carbonate is present. This occurs because the solubility product of calcium phosphate is less than that for calcium carbonate. In either case the magnesium precipitates as magnesium hydroxide because the solubility product of magnesium hydroxide is less than either magnesium carbonate or magnesium phosphate. Proper choice of treating materials gives desired results.