The following letter is the beginning of a series of letters on economic subjects of concern to the Egg Industry. We hope the information presented in forthcoming issues will contribute to a more thorough understanding of Industry economic problems, and will help to stimulate short- and long-term solutions to these problems. Your suggestions for future topics are welcomed.

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U.C. Poultry Specialist

The Mathematics of Surplus Production

Since 1965, California egg producers have had nine negative income years. In other words, losses in one out of every two years. During this period, we have seen three principal forces interact with the result of giving us too many eggs for the demand.

Human population increases each year at about a 1% rate. This should result in a greater demand for eggs, but per capita consumption since 1970 has gone down at a rate of 1.25% per year.

On top of this, the productivity of the U.S. flock has gone from 218.0 eggs per hen in 1970 to '243.6 eggs in 1982. This is an increase in production at the rate of 1.0% per year.

If we look at these three areas of change in supply and demand with respect to our last real good year (1976), we can start to see why recent profits have been non-existent.

In 1976, estimated Southern California profits were $1.37 per hen. This was a year when the U.S. table egg layer count was 243.9 million, rate of lay was 236.1 eggs per hen, and per capita egg consumption was 270 eggs.

In 1982, U.S. population growth would have called for an increase in layer numbers of 14.6 million hens. But, a reduction in per capita consumption of seven eggs would have reduced this to 7.9 million hens and increased productivity of 7.5 eggs per hen would have further reduced that to a need for only 100,000 additional hens.
In fact, though, U.S. layer numbers increased by 8.5 million hens between 1976 and 1982 -- 8.4 million more than was needed to place us in a comparable supply/demand balance to 1976.

The table below illustrates the estimated surplus for each year relative to 1976 and the Southern California estimated profits associated with each level of U.S. surplus.

### U.S. Layer Requirements Using 1976 as a Base Year*

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</thead>
<tbody>
<tr>
<td>U.S. total layers (million)</td>
<td>274.1</td>
<td>275.5</td>
<td>281.9</td>
<td>288.3</td>
<td>287.6</td>
<td>286.7</td>
<td>283.7</td>
</tr>
<tr>
<td>U.S. table egg layers (est.)</td>
<td>243.9</td>
<td>245.2</td>
<td>250.9</td>
<td>256.6</td>
<td>256.8</td>
<td>255.2</td>
<td>252.5</td>
</tr>
<tr>
<td>U.S. annual rate of lay/hen</td>
<td>236.1</td>
<td>235.5</td>
<td>238.7</td>
<td>240.1</td>
<td>242.2</td>
<td><strong>242.9</strong></td>
<td>243.6</td>
</tr>
<tr>
<td>U.S. per capita egg consumption</td>
<td>270</td>
<td>268</td>
<td>273</td>
<td>278</td>
<td>272</td>
<td>264</td>
<td>263</td>
</tr>
<tr>
<td>U.S. estimated surplus or deficit (Current year relative to 1976)</td>
<td>+.1</td>
<td>-2.0</td>
<td>+2.3</td>
<td>+7.6</td>
<td>+11.8</td>
<td>+8.5</td>
<td></td>
</tr>
<tr>
<td>Est. profit/loss/hen - So. Calif.</td>
<td>+$1.37</td>
<td>+$.82</td>
<td>+$.24</td>
<td>+$.34</td>
<td>-$.52</td>
<td>-$.27</td>
<td>-$.92</td>
</tr>
</tbody>
</table>

*Assumes a 1%/year increase in U.S. population

It can be readily seen that surpluses of the magnitude of 7 million or more hens create enormous deficits in industry returns. The highest estimated surplus (1981) was not associated with the lowest return probably because of increases in exports roughly equivalent to the production of 4 to 5 million hens.

Changes in per capita demand for eggs and changes in the productivity of our flocks must be taken into consideration if the industry is to optimize the balance between supplies and demand.

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