the single-particle nuclear shell model of Mayer[4]. This assumption is supported by the reported spin of 5/2 [5] for the odd proton nucleus of $_{93}Np^{237}$. Hence it would appear that the nuclei of $_{95}Am^{241}$ and $_{93}Np^{237}$ have a ground-state of $f_{5/2}$.

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Separation of Particulate Materials into Size-Ranges

During an experiment a beaker was used for collecting a stream of small glass spheres issuing from a chute. A number of the spheres escaped over the edge of the beaker, after rebounding from the layer of material in the bottom, and on examination this fraction was observed to be of considerably more uniform size than the original sample; an observation which suggests a simple method for the separation of non-cohesive particulate materials into sized fractions.

The following test was then carried out.

Glass spheres having diameters of 0·02–0·06 in. were allowed to fall from a funnel into a polythene beaker 3 in. diameter and 3½ in. high, the height of fall being 12 in. The polythene beaker was placed within a beaker of 1-litre capacity which acted as a receptacle for the separated fraction.

The material was supplied until the inner beaker was filled to a depth of 1½ in., when the flow was stopped, the beaker emptied and the process repeated.

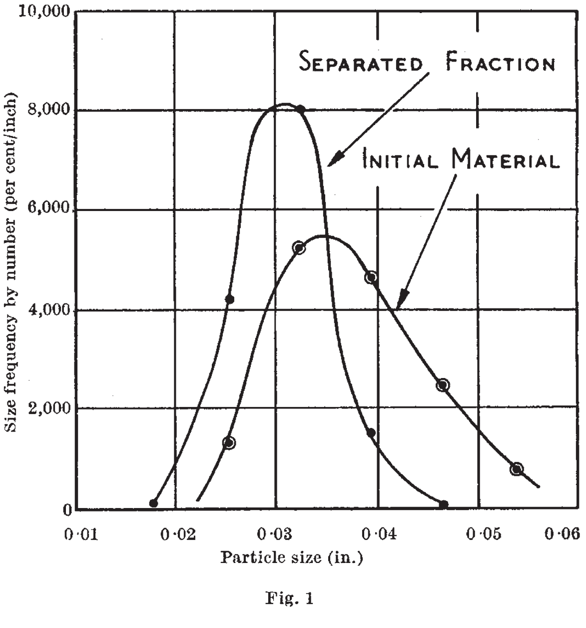

Fig. 1

The size-distribution curves for the original material and the separated fraction are given in Fig. 1.

In a further test 800 gm. of steel balls of ⅛ in diameter and 200 gm. of steel balls of $\frac{1}{16}$ in diameter were mixed. 7 gm. of the $\frac{1}{16}$-in. diameter balls, completely free from ⅛-in. diameter balls, were recovered after one pass of the mixture.

It is interesting to note that a possible explanation of the phenomenon is that in the manifold collisions which occur when the falling spheres are brought to rest, the particles of smaller mass acquire a higher mean velocity than those of larger mass, and this enables them to rebound to sufficient height to escape over the edge of the beaker. If this explanation is correct, then it would suggest a close analogy between the behaviour of a mixture of gases of different molecular weight and a powdered material having a wide range of particle size.

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Air-Flux Sensitivity of the Pulses of the Negative Point to Plane Corona in Air at Atmospheric Pressure

The negative point to plane corona, glowing at atmospheric pressure in air, may be looked upon as a result of a large number of self-quenched electron avalanches per unit time. The effect of self-quenching occurs only in the case when an electronegative gas component is present and is due to a cloud of negative ions influencing strongly the electric field in the vicinity of the sharp end of the cathode[1]. When a sufficiently high potential difference exists between the cathode and a flat anode, the current pulses follow each other with a high frequency and the negative ions strongly decrease the amplitudes of the voltage pulses occurring on the resistance R placed in series with the point cathode[2,3]. For a sufficiently high frequency of the electron avalanches (increases with the applied voltage), the following approximation should describe the change of the amplitude of the voltage pulses due to the negative-ion concentration or pulse-frequency:

$$A \pm \Delta A \sim \frac{1}{N \pm \Delta N} \sim \frac{1}{K \pm \Delta K}$$

for $N_{V_1} < N < N_{V_2}$, and $V_1 < V_2$.

Here A is the amplitude of the voltage pulses, N their frequency, V_1 and V_2 are the values of the voltage, N_{V_1}, N_{V_2} are the frequencies of the pulses at certain critical voltages V_1, V_2. K is the negative-ion concentration in the vicinity of the cathode when the frequency of the pulses is N.

The values of N or K may be changed by: (*a*) blowing away a number of negative ions per unit time resulting in a decrease $(-\Delta K)$ of K; (*b*) cooling the vicinity of the sharp end of the cathode resulting in a decrease $(-\Delta N)$ of the number of primary electrons N initiating the avalanches.

All this suggests in general that a change of N or K for a constant voltage V $(V_1 < V < V_2)$ may be measured by the intermediary of the amplitude change of the pulses. This may be done by discrimina-